TECHNOLOGY DEPT.

Gas Journal

Vol. 266. 103rd Year. LONDON, APRIL 11, 1951. No. 4584. Price 1/-

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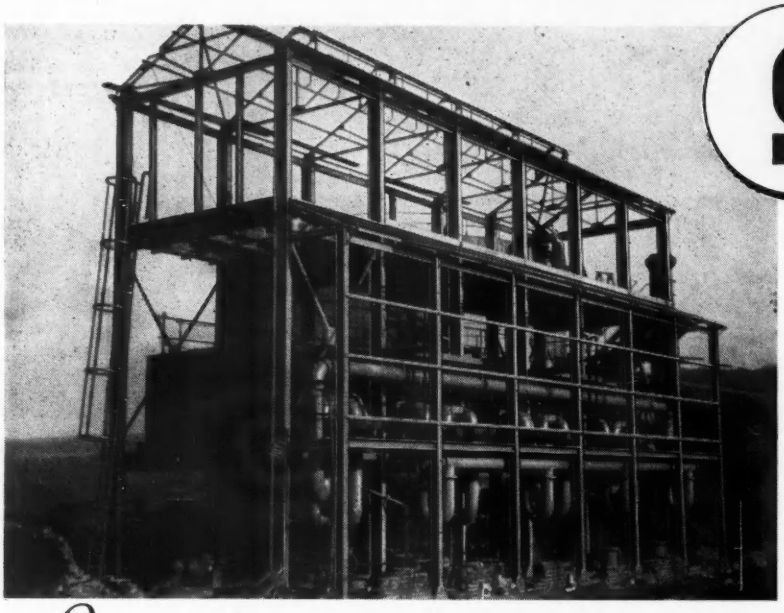

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Years of experience in the design of gasworks plant have made Oxley pre-eminent in this field. Illustrated is a set of four Purifier Boxes in course of erection each 14 ft. square by 6 ft. deep complete with 12 in. dia. connections and valves. The whole unit is housed in a steel framed building with annexe connection house. 10 ft. above the boxes is a reinforced concrete oxide storage floor, 60 ft. long by 17 ft. wide. Chutes are built in this floor for feeding boxes. The house is sheeted with asbestos corrugated sheeting and "Perspex" lighting. A 5 cwt. barrow hoist is installed for lifting oxide to the storage floor. Side chutes are also fitted for feeding existing ground floor purifiers from the storage floor.

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THIS PILOT GOVERNOR IS OPERATED BY AN EIGHT-DAY CLOCK, AND CHANGES THE PRESSURE TO MEET PEAK LOADS, ACCORDING TO REQUIREMENTS. A DIFFERENT LINE CAN BE GIVEN FOR EACH DAY OF THE WEEK IF REQUIRED.

The **BRYAN DONKIN CO LTD** · Chesterfield

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IT'S BUNDY
for every tubing job.

Any way you look at it, Bundy Tubing helps make your stove a better one — in production, performance, and value. No other tubing can match ***all*** its advantages.

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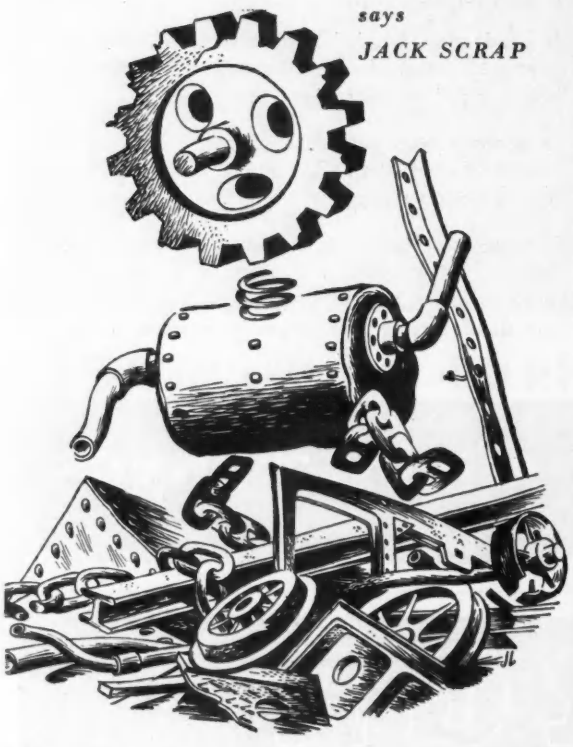
says
JACK SCRAP



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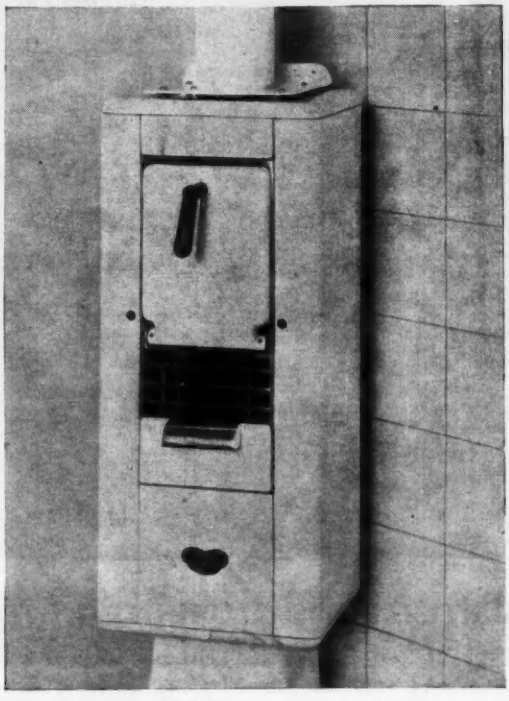

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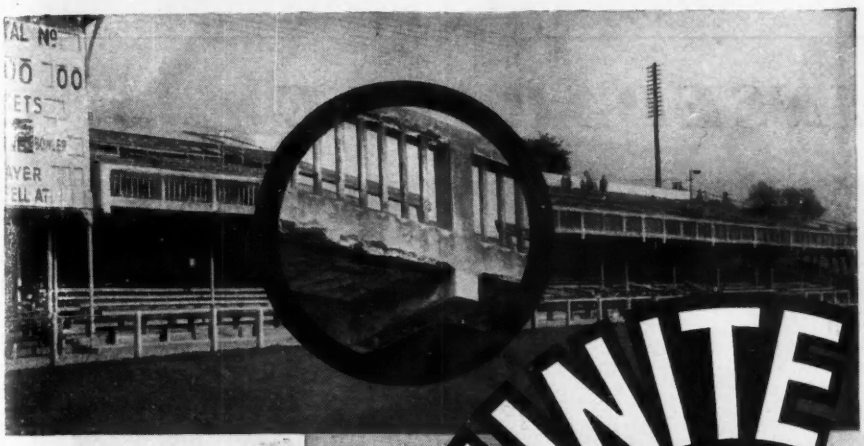

GUNITE REPAIRS to the Grandstand at 'Trent Bridge.' Before and after treatment.

Estimates given for encasing structural steelwork and covering the wearing surface of chutes and bunkers.

GUNITE

Photographs by kind permission of the Nottinghamshire County Cricket Club, and Messrs. Sutton & Pearce, Chartered Architects and Surveyors 15, Clarendon Street, Nottingham.

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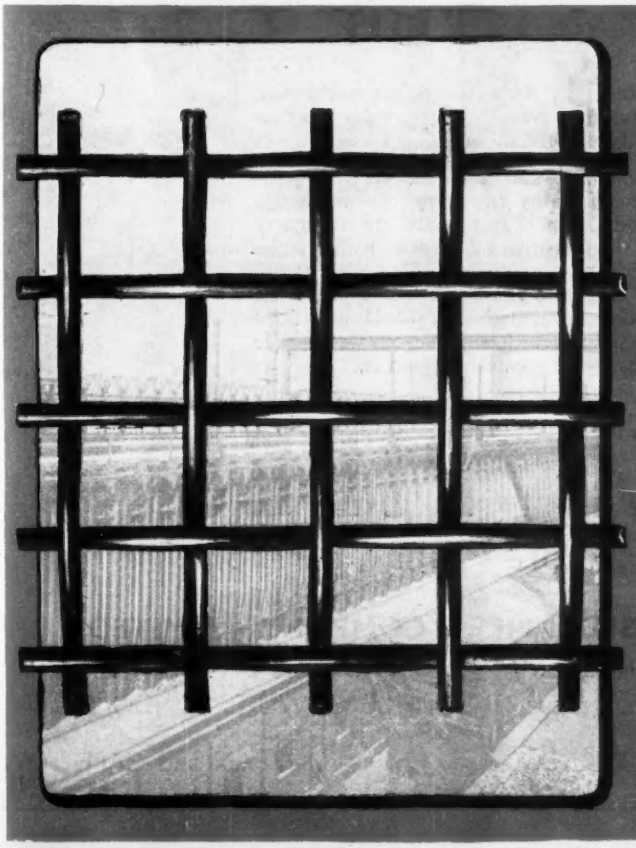

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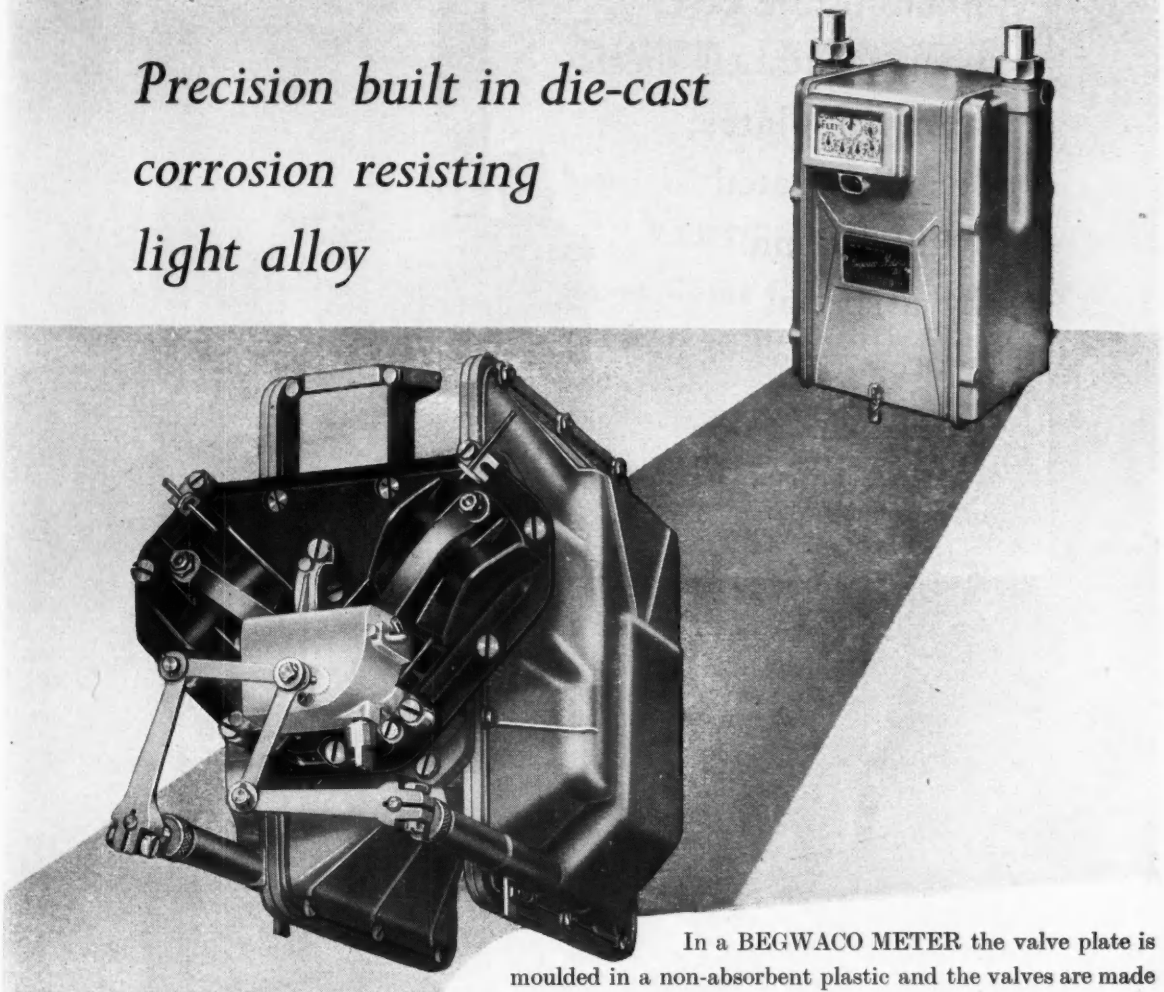
Precision built in die-cast corrosion resisting light alloy



In a BEGWACO METER the valve plate is moulded in a non-absorbent plastic and the valves are made of a graphite-impregnated plastic. This self-lubricating surface ensures a silent, frictionless movement — always accurate because the stainless steel bearings and Monel metal linkages do not corrode. To complete the cycle of trouble-free operation, the die-cast gear-box enclosing the index and prepayment mechanism drives is packed with graphited grease.

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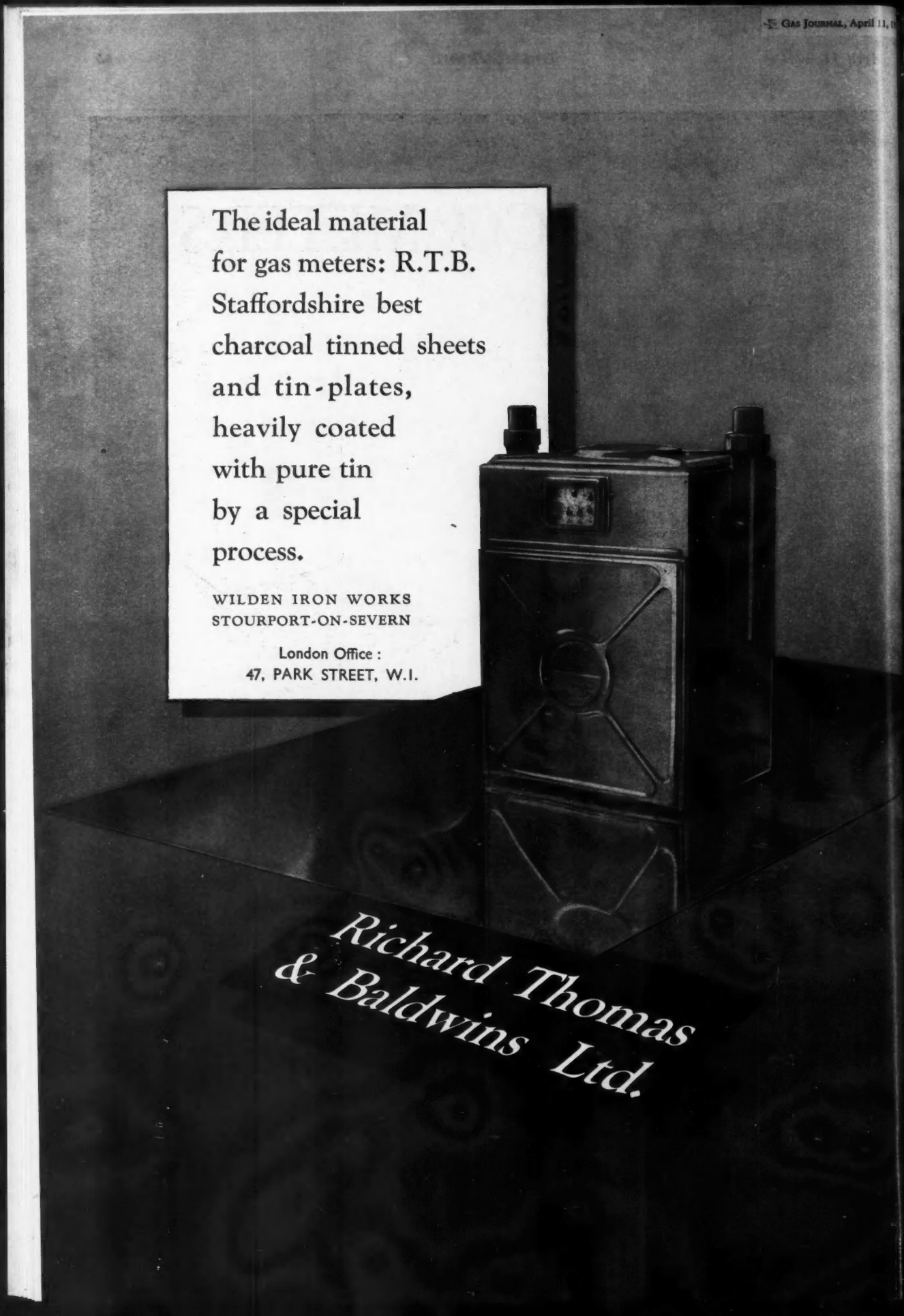
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will ensure a plant of First Class Construction completed within the shortest possible time

Our records show that we can complete new plants within 18 months to 3 years from date of order, naturally depending upon the size of the installation viz:—

½ to 1 million cubic feet/day in - - - -	18 months
Up to 8 million cubic feet/day in - - -	3 years

C.O.L. INTERMITTENTS therefore are not only sooner in full production but they also possess these well-known advantages

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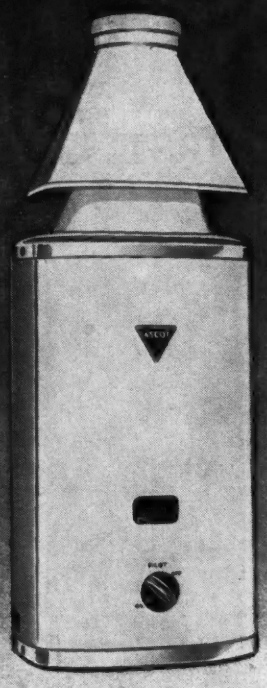
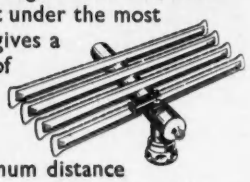
BETTER SERVICE TO THE USER

IMPROVED APPEARANCE



Ascot research now adds to the inherent advantages of instantaneous water heaters, by incorporating these modifications in the new Ascot 709 Multipoint:—

STAINLESS STEEL BURNER: selected after extensive research into the possibilities of manufacturing burners from materials other than brass. The new burner is so highly resistant to corrosion that blockage from this cause, *and therefore burner maintenance*, is virtually eliminated. Consequently, throughout its life, the stainless steel burner can be relied upon to maintain full output under the most adverse conditions. The burner fitted to the 709 Multipoint gives a thin flame and is capable of operating over a wide range of calorific values with relatively low burner pressure. Stainless steel also gives great strength and rigidity.



ASCOT

RE-DESIGNED HEAT EXCHANGER: the minimum distance between the fins has been increased with consequent benefit to maintenance life.

BUILT-IN GAS GOVERNOR

SINGLE ROTARY CONTROL GAS COCK: elimination of the horizontal main and pilot gas cocks, coupled with a *reduction in overall height* to 3' 4", greatly enhances appearance and gives increased flexibility in installation.

In other respects the 709 follows the successful specification of the NEA 32/6.

An alternative model—type 709B—as type 709, but incorporating a water governor and five position temperature selector. This heater is designed for mains connections where varying water pressures are encountered. Constant water flows are provided irrespective of water pressure fluctuations, the actual flow being variable according to the setting of the temperature selector.

Ascot makes the most of gas

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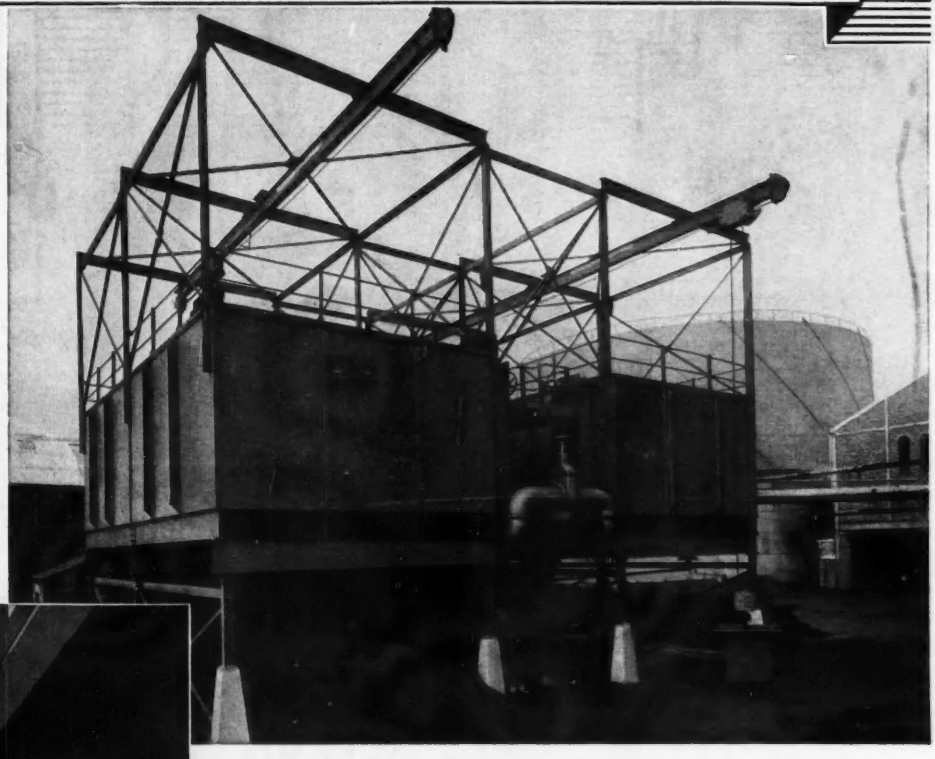
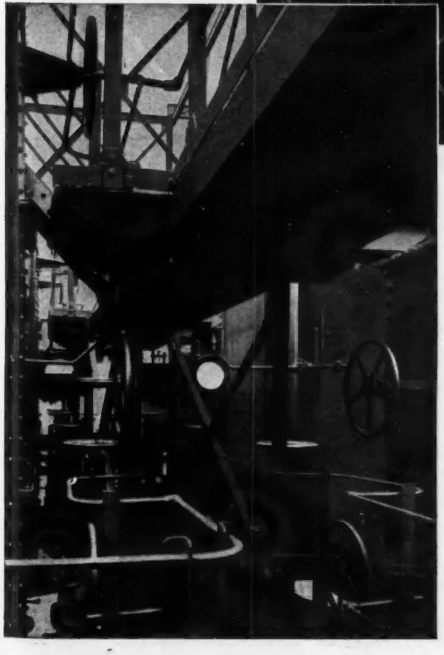
Branches at: BELFAST, BIRMINGHAM, BOURNEMOUTH, GLASGOW, MANCHESTER

Whessoe Purifiers





The illustrations show a 4-box set of Whessoe purifiers, each 18 ft. x 18 ft. x 10 ft., with a capacity of 1½ million cu. ft. per day, for the Ormskirk Undertaking of the N.W. Gas Board.

This is a simple installation with modern features—deep, welded mild-steel, overground boxes, with divided and reversible gas flow. Simple and efficient charging is provided by Morris 3-ton skips, operated by pulley-blocks, with hoisting and traversing controlled by an electrically driven winch, which is also arranged to provide for cover-lifting.

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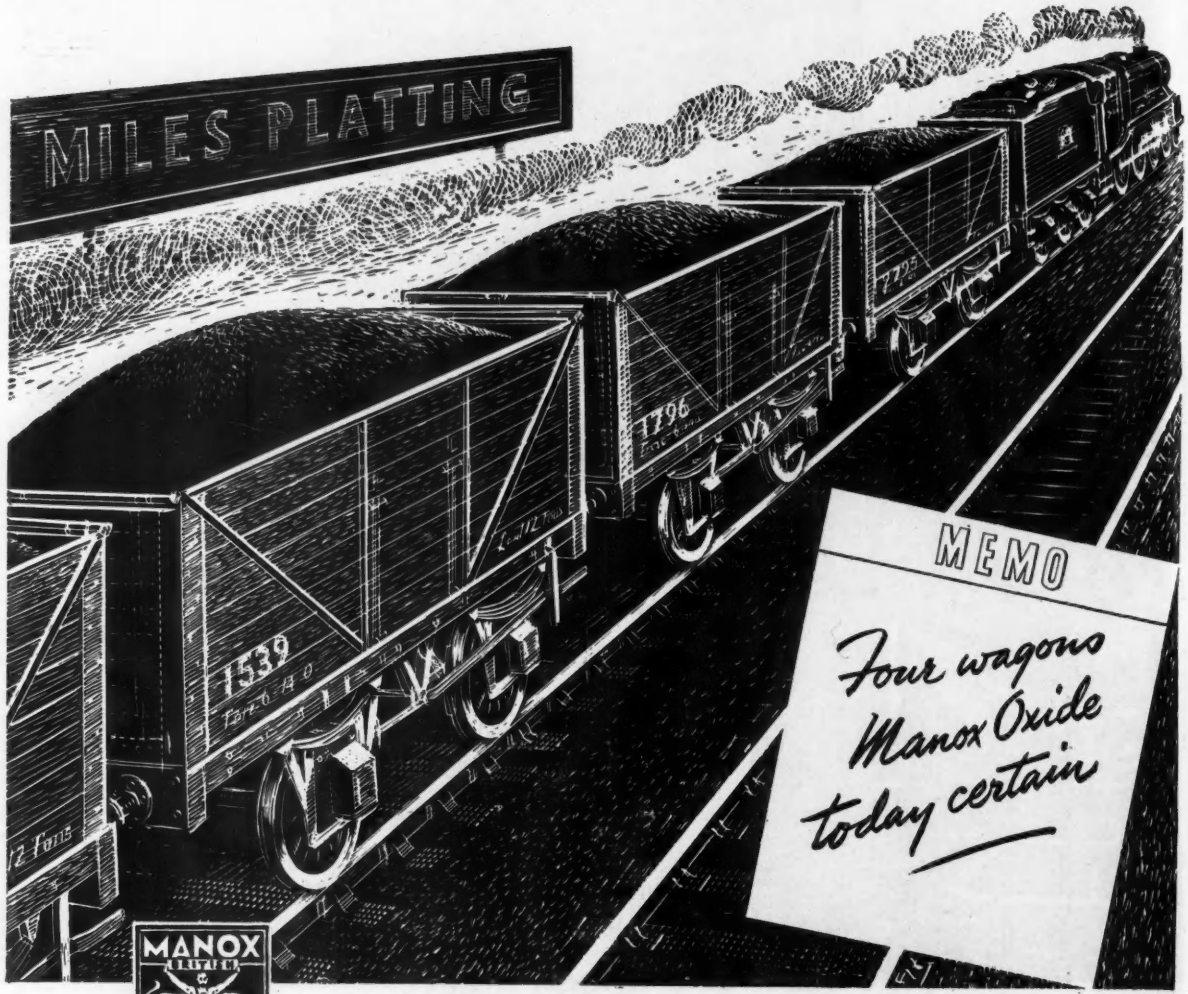
FOR THE GAS INDUSTRY



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INCORPORATING MANCHESTER OXIDE CO LTD

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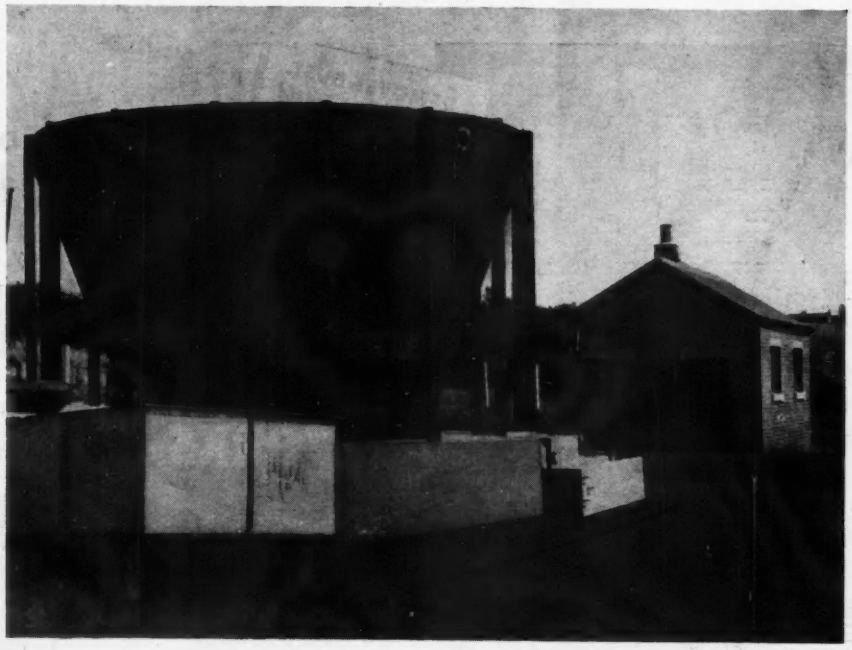

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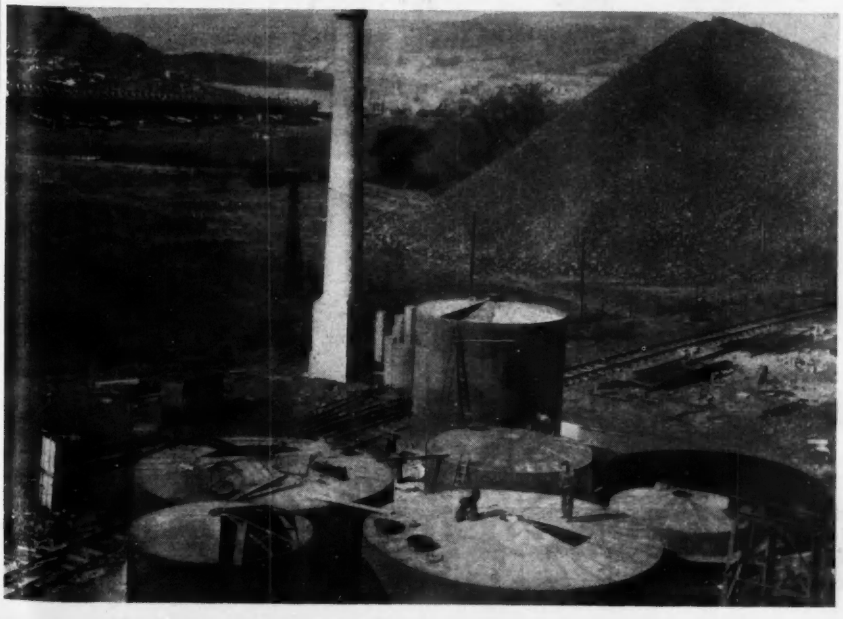
STEEL MAINS

This photograph shows a special conical vessel 27′ 0″ dia. x 20′ 0″ high made by us for a N.E. Colliery.
The bottom L.H. illustration shows part of a large battery of oil tanks being erected in South Wales.

WELDED STORAGE TANKS AND SPECIAL VESSELS



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REMOVES DUST FROM ANYWHERE

REMOVES HOT SOOT AND ASH

Designed specially for GAS WORKS

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VACUUM CLEANER

Model T.87 has been specially designed to be of maximum service in gas works. It is a highly efficient, large capacity, mobile unit with a water cooled container for receiving hot dust and smouldering ashes. Can be used by up to four operators for surface cleaning.

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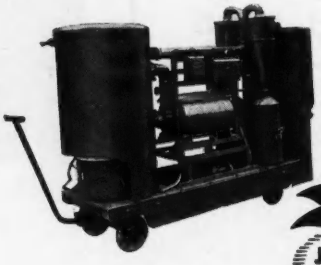

B.V.C JUBILEE 1901 1951

B.V.C INDUSTRIAL VACUUM CLEANERS

The British Vacuum Cleaner & Engineering Co. Ltd., Dept 63 Goblin Works, Leatherhead, Surrey

TYPE J·47

ALUMINIUM SERVICE & APPLIANCE GOVERNOR

AVAILABLE IN SIZES 3/4" TO 2"

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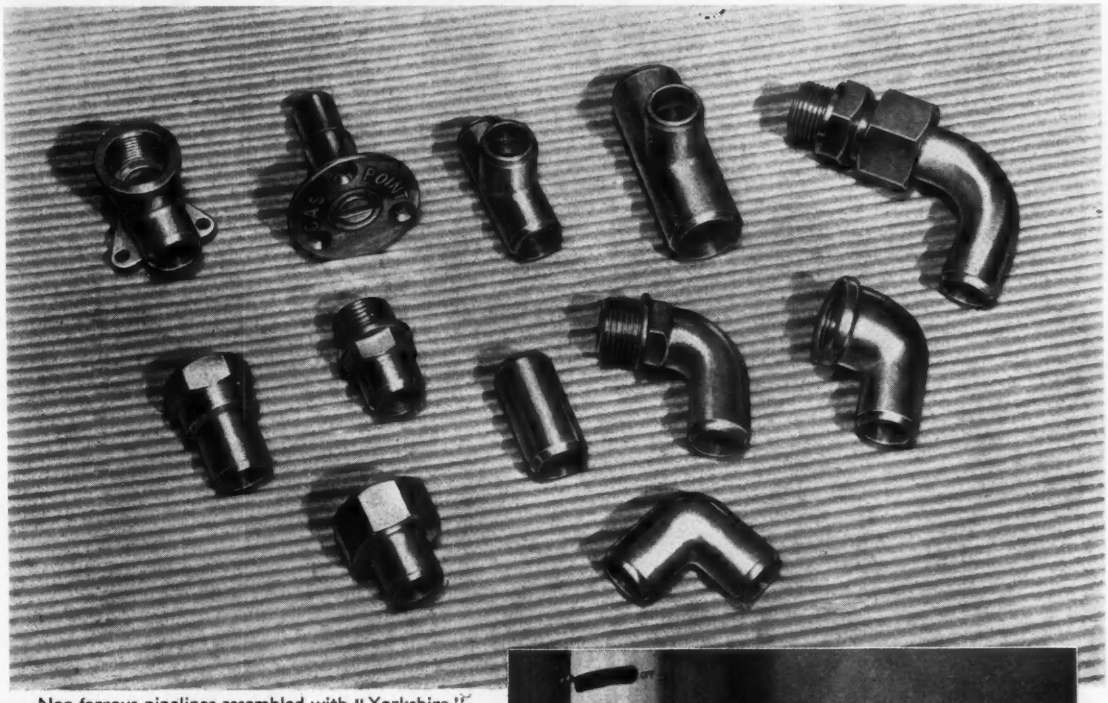
JEAVONS ENGINEERING CO · TIPTON · STAFFS

PROPRIETORS · E.E. JEAVONS & CO. LTD

"Yorkshire" FITTINGS

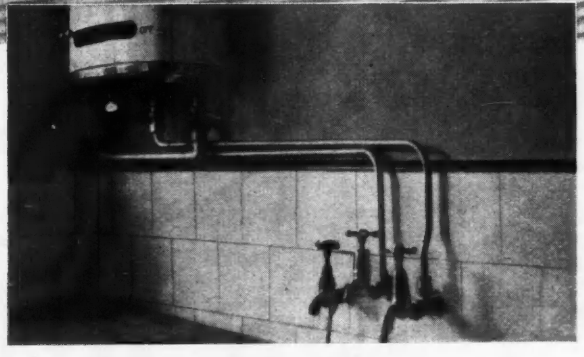
for gas service, carcassing and installation pipelines



Non-ferrous pipelines assembled with "Yorkshire" Capillary Fittings are neat in appearance, permanently reliable, simple and quick to instal and show a definite saving in materials and labour costs; the smooth, full bores ensure an unrestricted flow of gas to the appliances.

"Yorkshire" Fittings are hot pressed from brass and are therefore non-porous, whilst the joints are proof against seepage and unaffected by expansion, contraction or vibration.

They are made in a wide range of types and sizes to cover all requirements for service, carcassing and installation pipelines. They are suitable for use underground as they are made from hot pressings in an alloy which ensures that the fittings are highly resistant to dezincification.

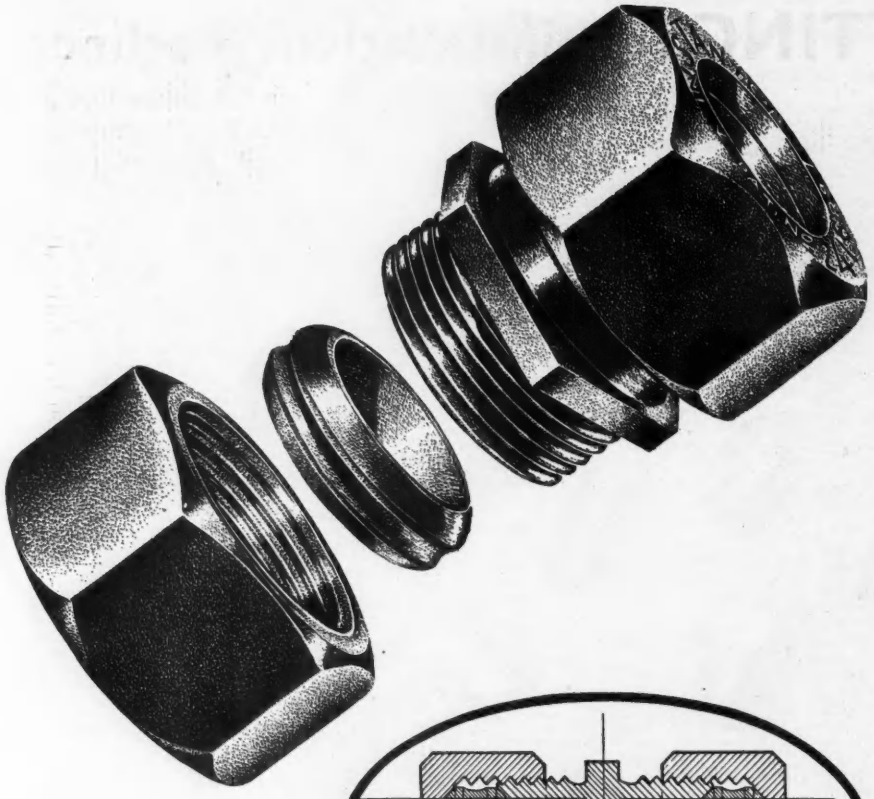


Above Installation Photograph by courtesy of The Eastern Gas Board, Tottenham Division.

The YORKSHIRE COPPER WORKS LIMITED

LEEDS AND BARRHEAD, SCOTLAND

Fyffe's fittings
for speed and efficiency



Requires no preparation of the tube—just screw up the nut.

Reduces fixing time to a minimum — joint made in less than a minute.

The patented double-interlock ring gives a positive grip on the tube.

Can be disconnected and reassembled with ease and security.

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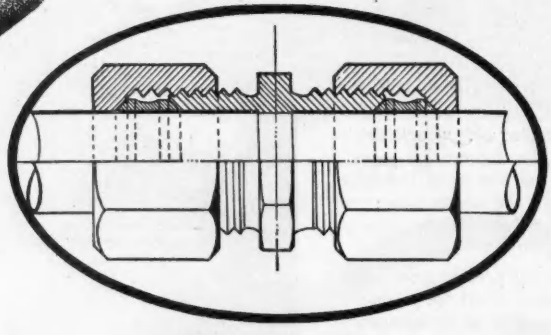

In use for over 20 years. Millions in use in Britain alone.

Fyffe's fittings
for ease and economy

Fyffe's manufacture a complete range of compression and capillary fittings in the "D.D.", "CONEOR", "INSTANTOR" and "INTEX P.T." patterns. For trouble-free service specify a Fyffe fitting.

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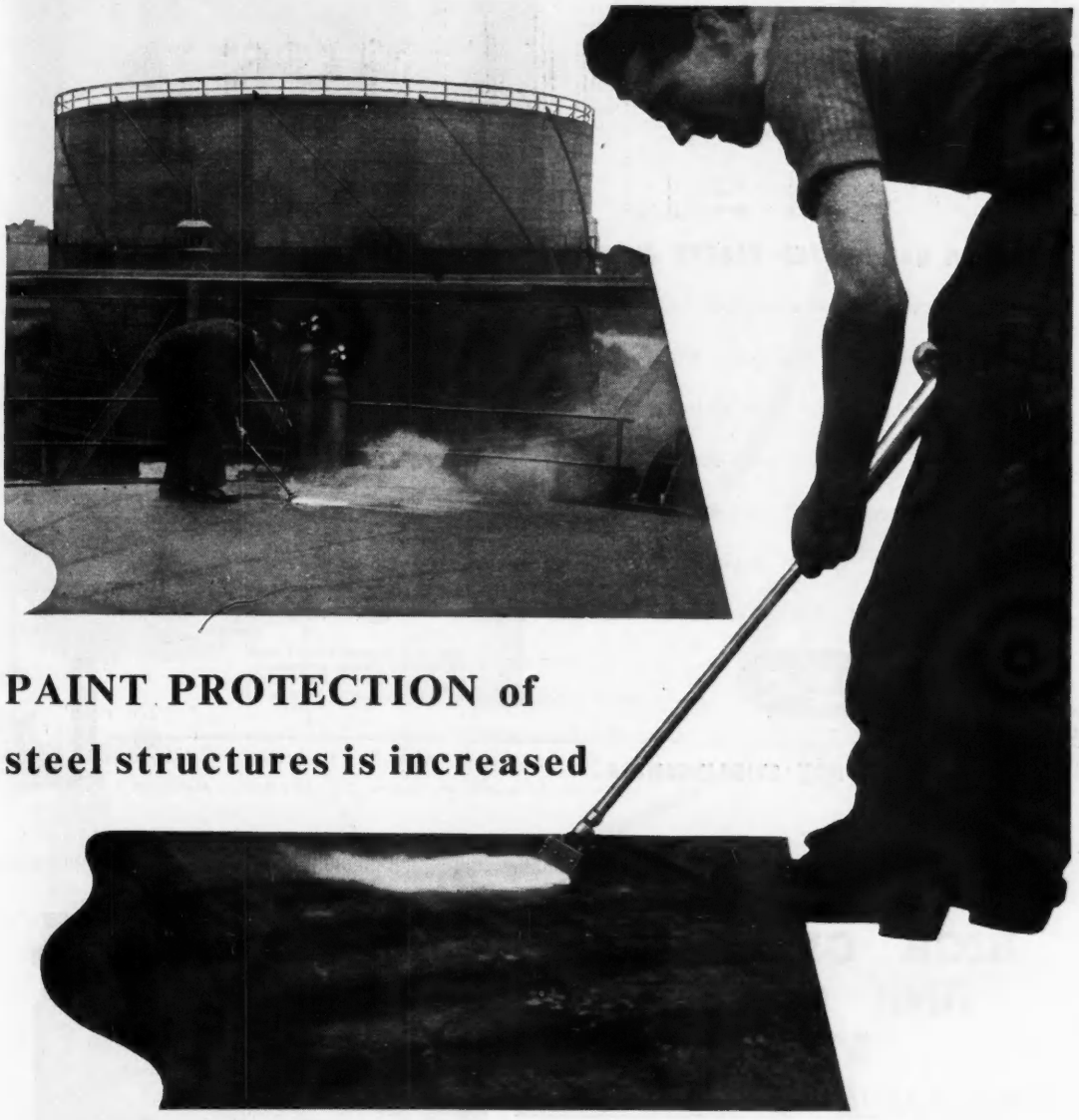

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On a dirty, rusty or damp steel surface, paint bonds badly, and usually starts to scale off after a comparatively short life. But on a clean, dry and warm surface, it bonds to perfection. To prepare such a surface is a simple matter when the Oxy-Acetylene Flame Cleaning Process is employed. It loosens and removes surface scale and corrosion and thoroughly dries the steel, leaving it in an ideal condition for the application of paint. Flame Cleaning increases the durability of the paint coat thereby reducing maintenance cost. Full technical details are gladly supplied. Write for Booklet T.1.B. No. 11.

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C4

CARRON GAS-HEATED PASTRY OVEN

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CARRON

This is a Carron product made by modern Carron processes embodying the Carron tradition for fine workmanship begun in 1759

Ever Perpetus

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Nothing but the best materials and workmanship used in their manufacture

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SIMON SQUARE WORKS, EDINBURGH

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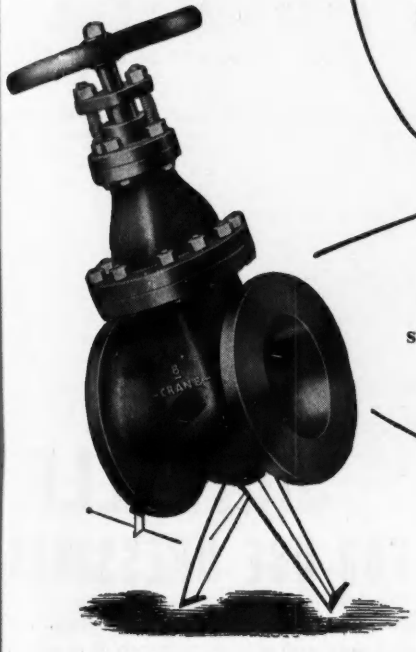
Crane Malleable Iron Banded Socket—Sizes: (equal and reducing) ¼″—6″. Black and Galvanised.

Crane Malleable Iron Strapped Drop Elbow. Sizes: ¼″—1¼″. Black and Galvanised.



Crane Cast Iron Gate Valve. Wedge Gate—non-rising stem or outside screw and yoke. Gun Metal wearing parts. Screwed ends. 2″—6″ and flanged ends 2″—12″.

Just three items selected from the Crane lists, which give details of Malleable Iron Plain and Banded Pipe Fittings for all purposes. Made to British Standard Dimensions—individually tested—taper threads. Also a wide range of Cast Iron and Gun Metal Valves.

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CRANE LTD., 45—51, LEMAN STREET, LONDON, E.1. WORKS: IPSWICH

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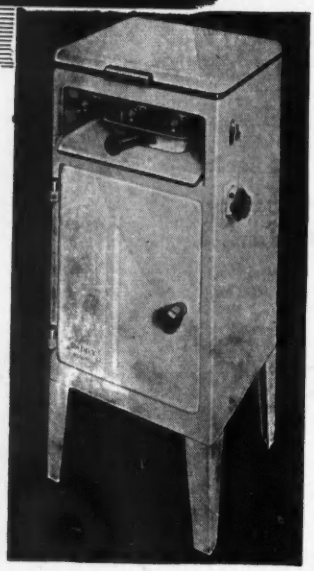
VISIT OUR STAND NO. D314 IN THE ENGINEERING GROUP OF THE B.I.F. CASTLE BROMWICH

A GREAT SUCCESS IN

Small kitchens and flats



The

Dainty

MINOR

This efficient little cooker of large capacity is made especially for small kitchens and flats.

Its cast iron construction ensures durability and low maintenance cost.

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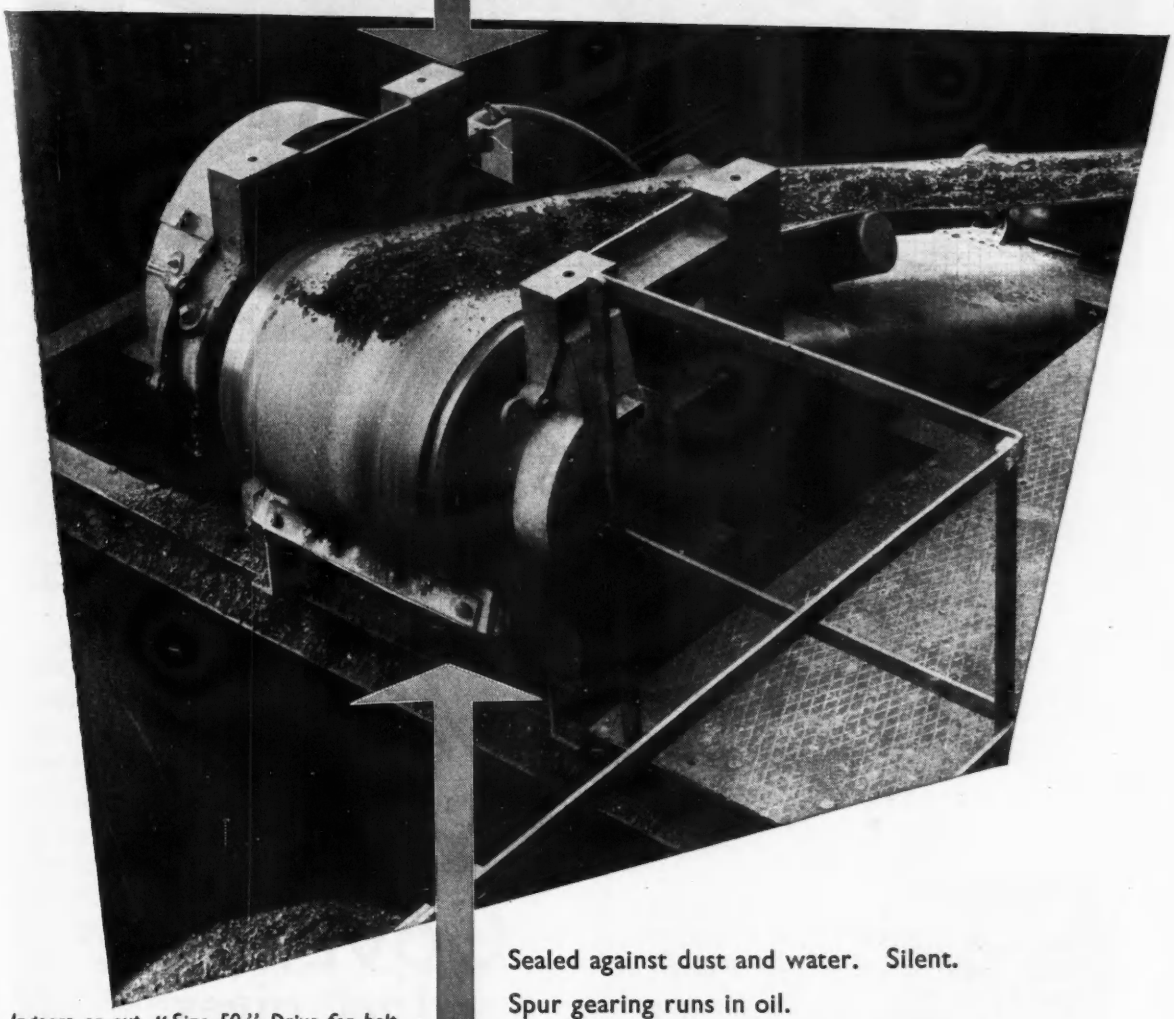

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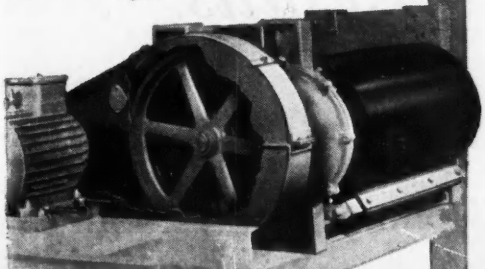

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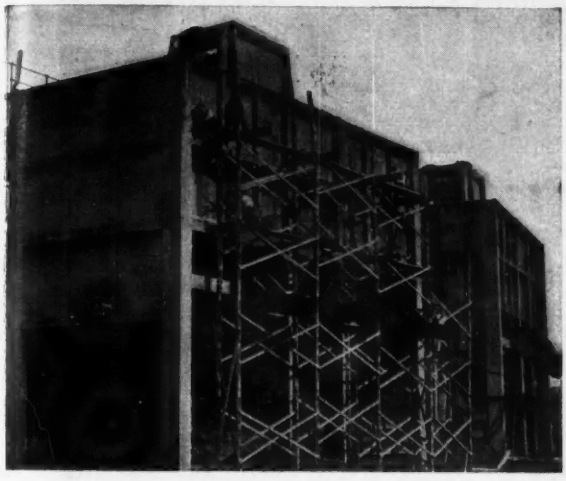

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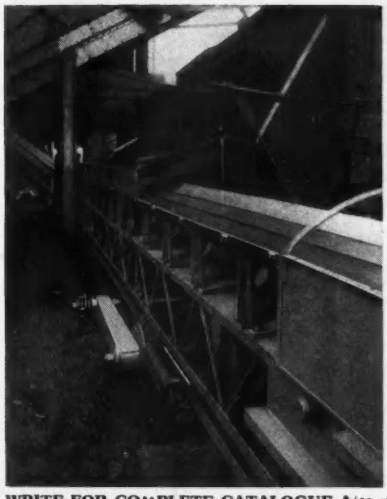

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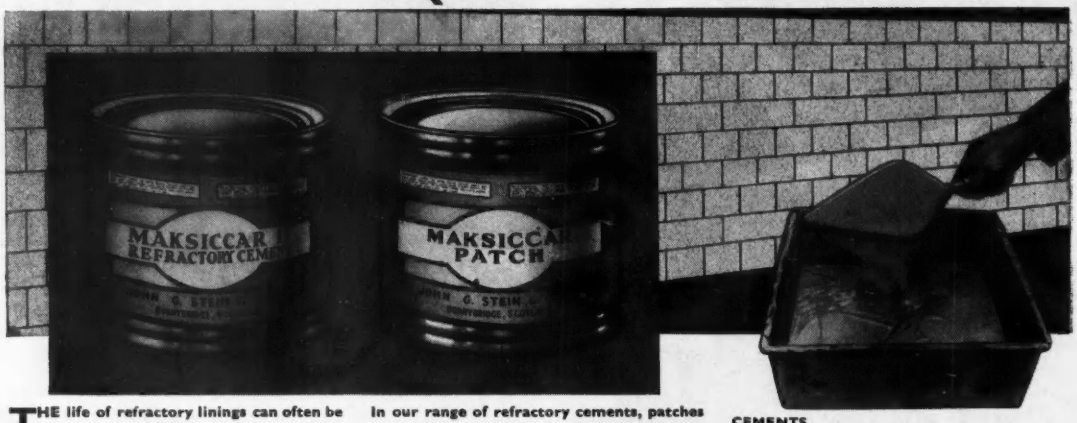

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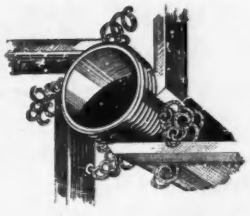

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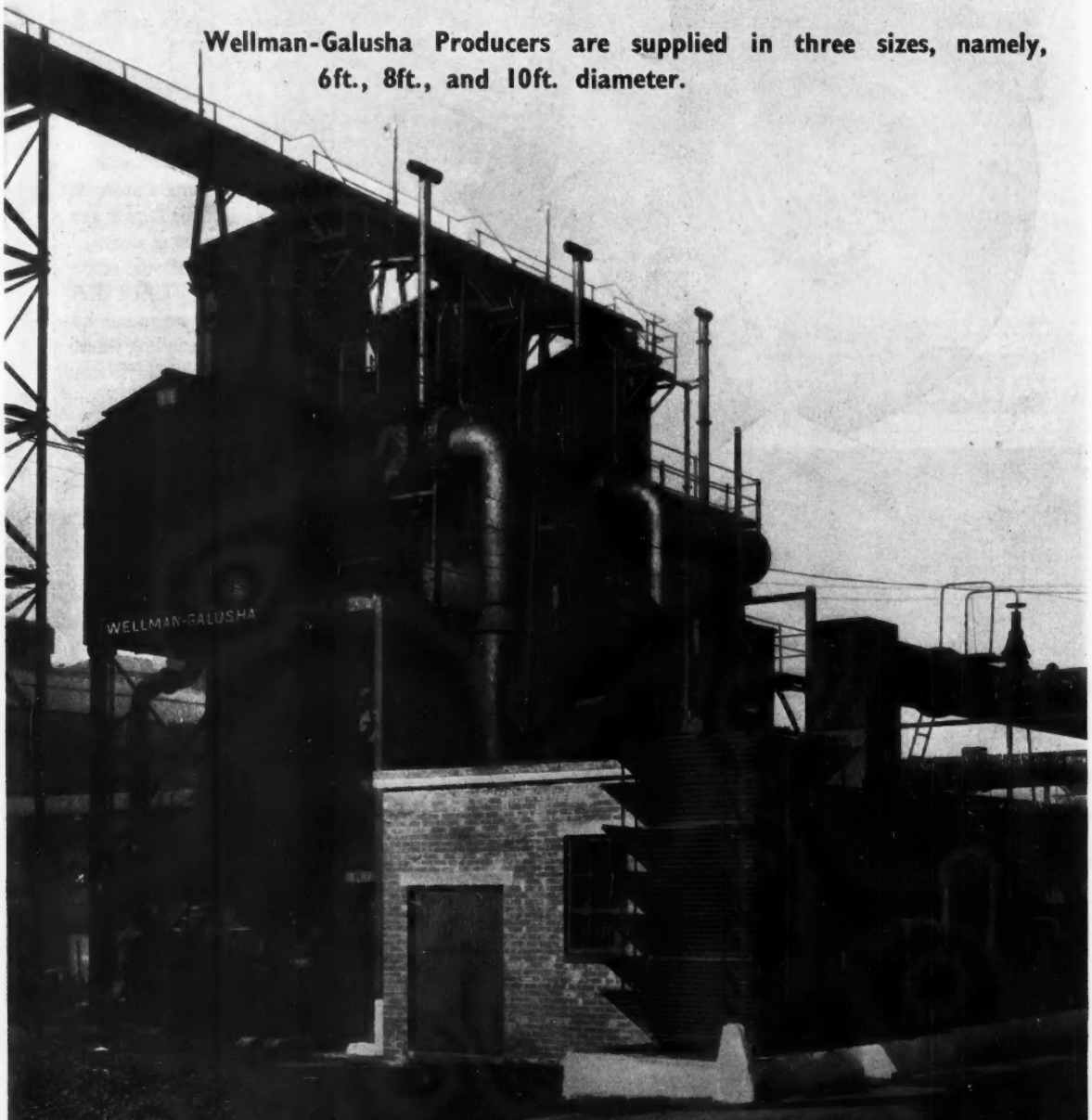

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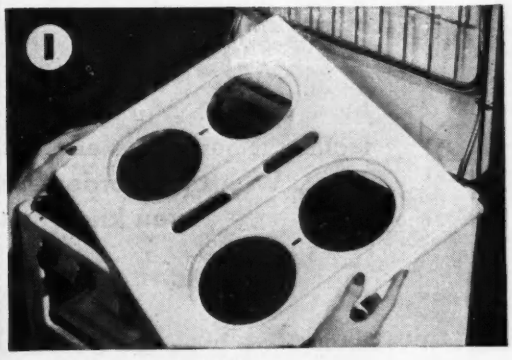

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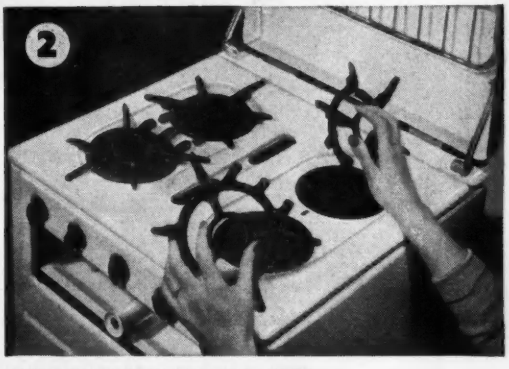

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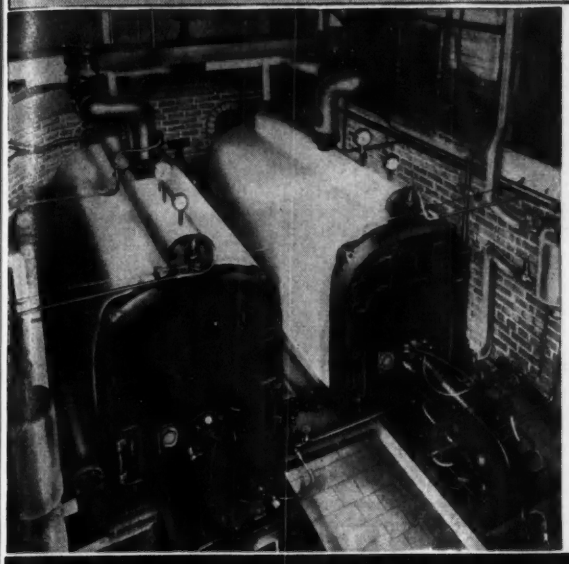

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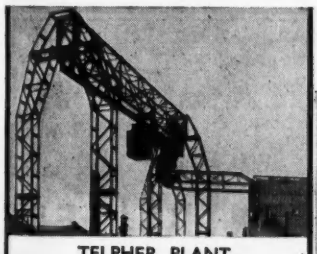

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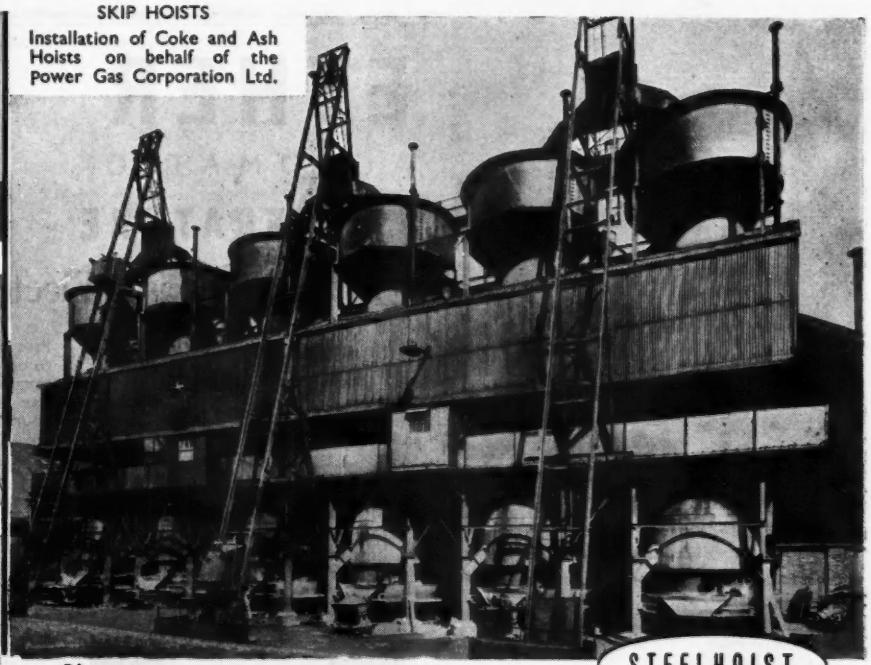

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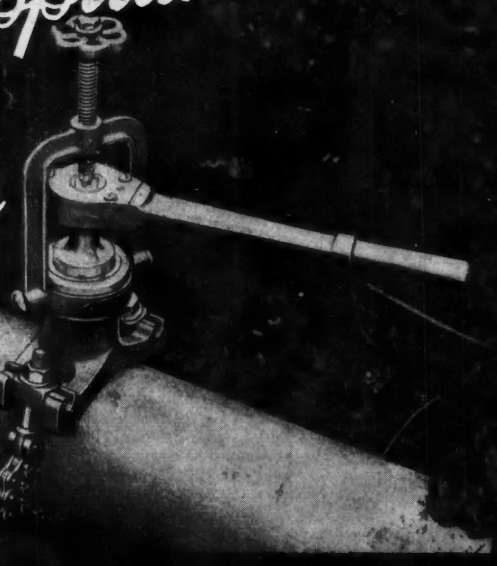

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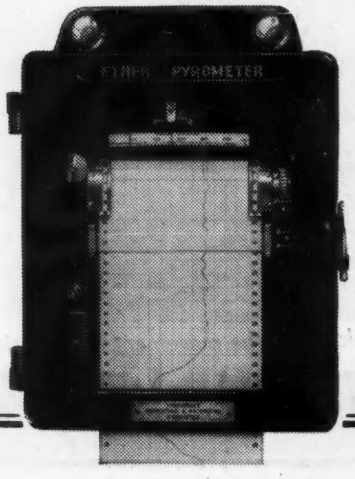

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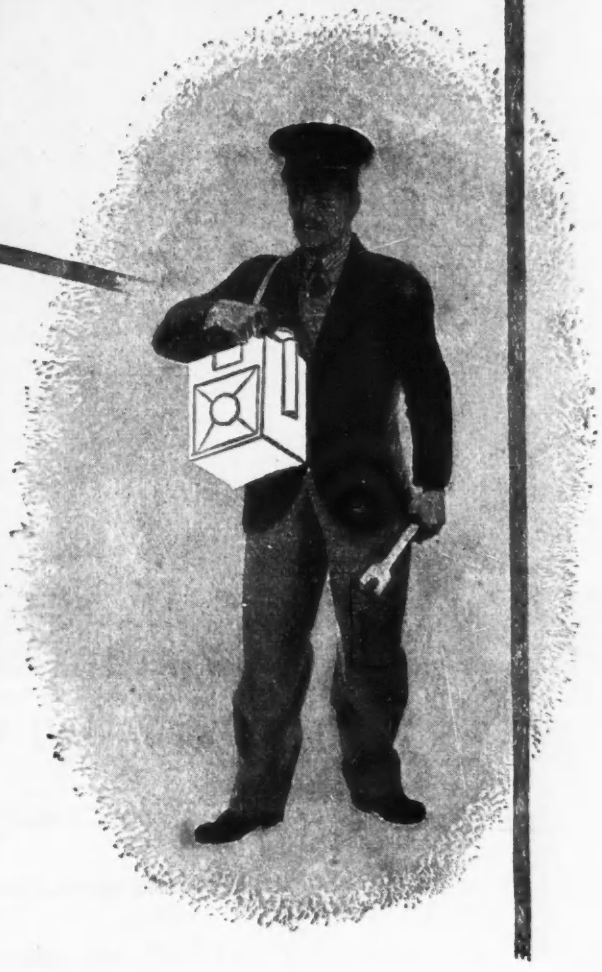

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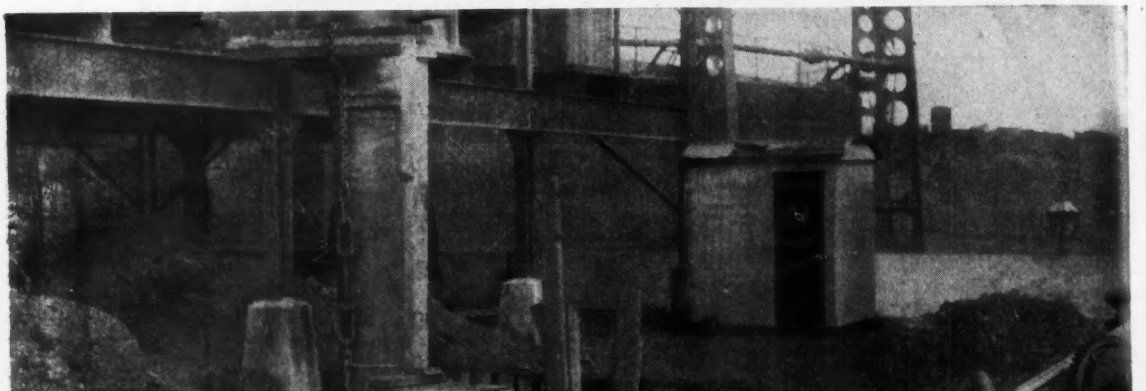

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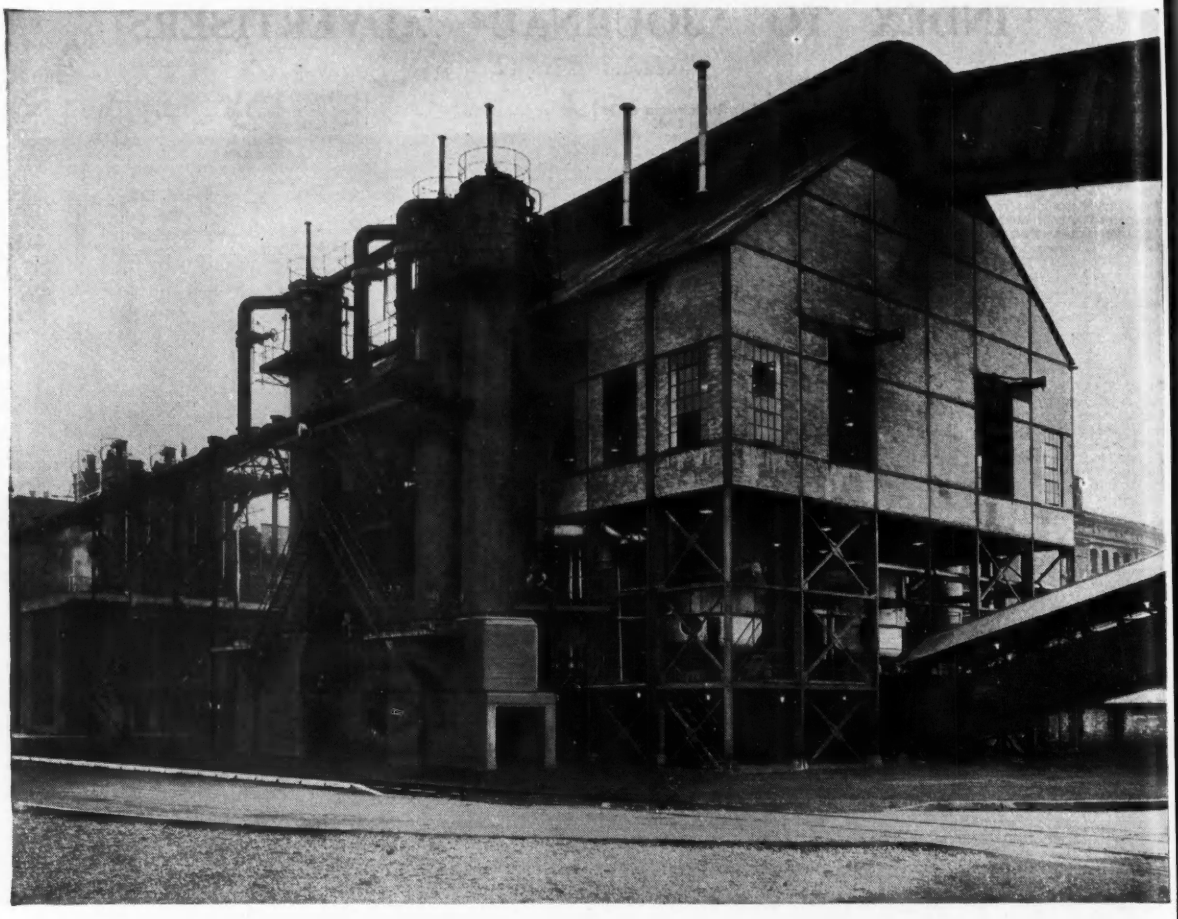

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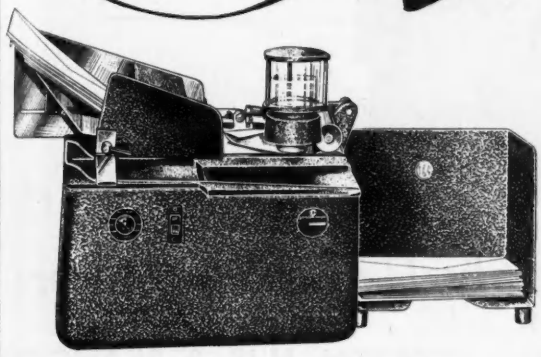

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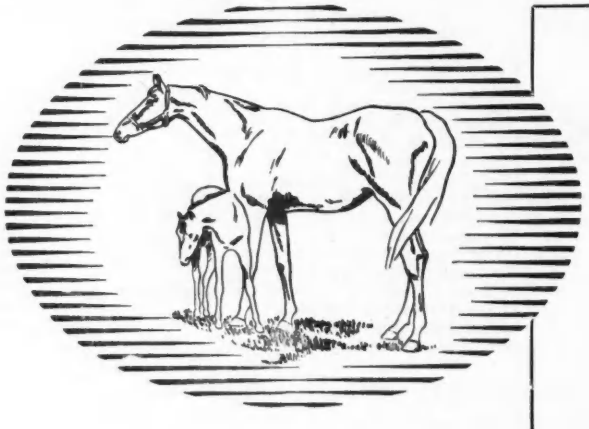

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GAS JOURNAL

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RESEARCH IN A SMALL WAY

SCIENCE has been defined as organised common sense, and nowhere is the definition more apt than in the use by Mr. W. E. Benton, whose paper we published last week (pp. 41-49), of the adjective 'scientific' as applied to that form of diligent enquiry directed to the improvement of the final product, the development of new designs or the improvement of productive processes in the research department of the smaller manufacturing establishment. The work comes very nearly under the heading 'operational research' of Dr. J. G. King's classification. 'The first priority is . . . the maintenance of efficient production.' The method is rather the application of existing knowledge than the discovery of new knowledge. And we are not sure that there is really a fundamental difference between the research of a small firm and that of a large one—except in the instance of the very large organisation which can afford to undertake 'pure' research, a sort of speculation rather than the routine necessity of operational control, and probably best carried out apart from it.

At any rate Mr. Benton's analysis of the part which can and should be played by the scientifically trained technician and his assistants in the everyday work of establishments of the size and capacity he has in mind is an eminently common sense piece of work which will well repay perusal and consideration. The gas engineer and administrator will recognise and appreciate the healthy attitude of the Chief Technical Officer of a company highly respected in the industry.

Apart from the control of production processes, which 'takes precedence over all other work' and involves routine tests of the processes themselves and the materials used in them, 'Mr. Brown' (Mr. Benton's 'chief chemist') will be responsible for the testing and inspection of bought-out parts and materials, the trials run under test of the finished product, the investigation of complaints and suggestions for improvement, whether these are received direct from the client or by way of the firm's representatives. Generally nothing more than inspection will be required in the control of bought-out parts and materials, for behind Mr. Brown there stands an impressive array of British Standard Specifications and industrial research associations. There would appear to be no reason at all why Mr. Brown should not rely on certificates issued by suppliers provided he deals with firms of reputation equal to his own. Mr. Benton himself notes the valuable work which is being done by research associations set up by the several industries. These have done much to standardise and classify goods and materials to stand up to definite requirements. The work of the Cast Iron Research Association is an excellent example of the reduction to order of a welter of trade names, secret recipes, and hidden mysteries in the preparation of a raw material so important in the manufacture of gas and coke appliances.

The trial under test of the new product is a special case of the routine test of the established finished product of the firm. It may involve three stages; first the design of the new product to meet the demand, secondly its trial and test in the course of development, and thirdly the trial and running under operating conditions before finally going into production and on the market. Mr. Benton's comments on these aspects of the work of the research department are illustrative of the high standard of service to the customer which is characteristic of his own company. In the early life of any new product there is need for co-operation between producer and user, a co-operation which will be forthcoming from the latter if he is approached in the frank, open manner suggested by Mr. Benton.

The staffing and organisation of the research department will no doubt be a matter of anxious care for the managing director. It will depend on a vast number of factors. Mr. Benton is emphatic that 'Mr. Brown' himself should be an honours degree man; he is equally emphatic that this must not be his only qualification.

No doubt the most important of his other attributes is that he must be able to work cheerfully in the team, with the corollary that he must be welcomed by

the other members of the team. As to his assistants one would think it would be highly advantageous if he could be provided with a young graduate of equal academic qualification who would grow up to take his place. In this, as in most other key positions, the selection of the understudy is only second in importance to that of the principal. Mr. Benton's remarks on the decentralisation of routine tests and inspection will meet with general approbation. In fact there is so much wisdom and understanding in this paper as to commend it to the study of most of the firms, large and small, engaged in the manufacture and construction of plant and appliances not only for the gas industry but most other industries as well.

THE GORGAS EXPERIMENTS

IN the *Journal* of February 28 we published in these columns an appreciation of the experiments in underground gasification being carried out at Newman Spinney by Mr. C. A. Masterman. Almost since the start of this work, the flow of information regarding progress and results has been satisfactorily maintained by the Ministry of Fuel and Power. If any points concerning the methods employed remained unanswered, they were dealt with in the excellent paper presented to the Institute of Fuel by Mr. Masterman on April 3. With this paper we are not concerned at the moment, since it added nothing of importance to our former comments on the subject, merely filling in detail and embellishing the main points then set out. What is worthy of some attention is the fact that this well-conceived meeting gave us not only a complete picture of progress to date in this country, but an equally detailed account of work carried out at Gorgas, Alabama.

Of all the experiments in underground gasification carried out in recent years, none has evinced a greater degree of friendly co-operation with scientists in this country than those at Gorgas. We have had excellent contact with work in Belgium, Italy, and Morocco—only Russia has, in typical fashion, failed to supply all the information we required—but the Gorgas experiments have had the advantage of being reported at first-hand. These experiments are being undertaken by the U.S. Bureau of Mines (who have hopes of producing a cheaper synthesis gas for the catalytic production of liquid fuels) and the Alabama Power Company, and when preparations neared completion, arrangements were made between these two bodies and the D.S.I.R. (through Dr. A. Parker, Director of Fuel Research) for a British representative to join the team of American investigators. The representative chosen was Dr. E. T. Wilkins, who spent a considerable time at Gorgas and who collaborated with Mr. J. T. Elder, the officer in local charge of the team, to write this paper. Entitled 'The Underground Gasification of Coal in the U.S.A.: An Outline of the Bureau of Mines' Experiments at Gorgas, Alabama,' the paper shed some new light on a subject which, although of only indirect concern to the town gas industry, is inevitably a source of keen academic interest to all who give some thought to the world's fuel and power resources.

In these experiments some 10,000 tons of coal were burnt *in situ* by the stream method—*i.e.*, a process in which a fire is lit in a pre-formed passage in the coal seam and combustion of the seam is maintained by passing air through the passage. When the offtake borehole was close to the burning coal face, gas having a calorific value up to about 100 B.Th.U. per cu.ft. was made, but at other times the gas made was partly burnt underground by air which had by-passed the reaction zone. One of the main objects of the experiment was to find out whether such by-passing could be prevented by filling the burnt-out area with fused and expanded roof-rock. From the magnitude of the back pressures which developed during the experiment it appeared that no continuous passages of more than a few inches in width could have remained open, either in the combustion zone or in the burnt-out area. No method of maintaining a wider passage adjacent to the coal seam has yet been envisaged, although the authors pointed out that a seam with a roof which was mechanically stronger or of higher melting point than that of the Pratt seam at Alabama might be advantageous in this respect. Heat losses into the overburden were considerable, and it appears likely that this problem will only be overcome when the difficulties of gas leakage and by-passing are solved.

FIRST TESTS WITH TURBINES

ONE of the most interesting aspects of the Gorgas experiments, as opposed to those in this country, is that attempts have actually been made to utilise gas turbines. The severe leakage referred to above seriously prejudiced the power output from the turbines, and at higher pressures this loss of gas amounted to about 80% of the total output. Nevertheless, the remaining 20% was able to provide power for pumping 20% of the air for combustion, which means that even the present inefficient installation could have been self-supporting if leakage could have been avoided. The authors state that: 'Extra power obtainable by complete burning of the combustible components of the gas, by reducing pressure loss underground, by the use of more efficient turbines, and by operating them at higher pressures, would then be in excess of the plant's requirements.'

It appears that during the trial period of 100 hours, the equipment behaved satisfactorily, although at lower temperatures there was some tarry matter deposited on the turbine blades. The product gas from the turbines contained about 18% carbon dioxide and virtually no oxygen during the tests; it had a calculated calorific value of 12-28 B.Th.U. per cu.ft., and at the discharge temperature of 1,000° to 1,100°F. it burnt steadily at both exhausts.

Both speakers at the meeting illustrated their talks with excellent lantern slides, and it would be difficult to envisage a more drastic contrast than was shown by the photographs of the authors' respective sites: Newman's Spinney, bleak, windswept, and with buildings and equipment as cheap and meagre as was dictated by the requirements of stark necessity; Gorgas, in

its hilly, rich, wooded country, with accommodation and equipment both ample and photogenic. Mr. Masterman and several contributors to the discussion heaped well-merited praise on the workers at Newman's Spinney, but although Dr. Parker testified to the clammy noonday heat and incidence of poisonous snakes at Gorgas, the views of the sun-drenched, verdant site discouraged his listeners from an excess of sympathy.

Summing up, there are four main points we wish to emphasise. Firstly, the Institute of Fuel is to be congratulated on combining these two papers at one meeting; the papers are, to a considerable degree, complementary, and their presentation side by side revealed the difference—and more particularly, the similarity—between the results of two independent pieces of research. Secondly, mention must again be made of the excellence of both papers; not only was their quality high, but each approached the subject along lines so similar that comparison was greatly facilitated. Thirdly, we would stress the co-operation and interchange of information which has graced these experiments. And lastly, we note with satisfaction the interest aroused by these experiments.

A SUBSIDISED LOAD

GONE, probably for ever, are those carefree days when we could say we wanted any and every load to which we could lay our pipes. It is not that we have elected to become more 'choosey.' Rather have we had 'choosiness' thrust upon us by what we are pleased to call the exigencies of the times: and we now have to give considerable thought in deciding what loads we want and can afford to carry, having, of course, due regard to industrial priorities. Under this heading crops up again the thorny question of street lighting—and it did, in fact, crop up at a recent meeting of the North Thames Gas Consultative Council.

The Council was discussing the Board's first report and statement of accounts—and someone quickly spotted that gas for public lighting was sold at a fraction over 7d. per therm, whereas it was understood that the very lowest price at which gas could be sold in the area to show a reasonable margin of profit was of the order of 11d. per therm. In other words, street lighting was being subsidised to the tune of about 4d. per therm—which, even if only 1.64% of the total output, still works out on the figures given at a loss in the region of £90,000 in the 11 months under review. What seemed to rankle most, however, in the mind of at least one member was that gas consumers living in an electrically lighted street were subsidising electricity.

It must, in fairness, be recognised that many long-term contracts have been inherited by gas boards from the former individual gas undertakings, which if there is no 'escape' clause must continue to be honoured in accordance with the original agreements. Unless, however, they can be renewed, on expiry, on an economic basis, few gas boards will seek to prolong them. Indeed, there could scarcely be any justification for doing so. There is evidence already of efforts by several boards to rationalise their street lighting charges, which seem to have proved unpopular with the local authorities concerned.

There is a further aspect of which some capital has been made in the past—namely, the 'prestige' value of gas street lighting. Is this to be jettisoned without thought? On balance, we doubt its real propaganda today. It is true it used to give us some little pride and satisfaction to be able to point to a famous street and say: 'That is gas!' (It was perhaps more satisfying to do so during an electricity failure.) But how many of the general public realise until it was pointed out to them that it was gas—and of those that did how many cared? If any gas board really feels that this load has propaganda value, then it surely has no option but to charge any loss to publicity account.

There is no room in business today for sentimental attachment to an outmoded system—though gas street lighting is *not* outmoded where it can pay its way. Correctly applied and properly maintained it is unquestionably an excellent form of lighting—as motorists and pedestrians alike will agree. It is also an off-peak load.

REACTIVATION OF BONE CHARCOAL

ON later pages we publish a highly interesting paper which Mr. W. L. Howe, of the Liverpool undertaking of the North Western Gas Board, and Mr. A. M. Moult, of Tate and Lyle, Ltd., gave at a meeting of the North Western Branch of the Institution of Chemical Engineers. Bone charcoal decarbonised in the Herreshoff gas-fired kiln is so far in advance of the reactivated char from coal-fired kilns, in its decolorising qualities and useful life in the refinery process that two Herreshoff gas-fired kilns (with waste heat recovery) could meet the whole process requirements of the refinery of Tate and Lyle at Liverpool now met by 24 coal-fired kilns. Since the capital cost of each type is roughly comparable—within the region of £15,000 to £25,000 per kiln—these results are revolutionary.

FESTIVAL FARE

THE Women's Gas Federation's contribution to the Festival of Britain was described by Dame Vera Laughton Mathews at a reception of women journalists on March 29. A national cookery competition called Festival Fare is to 'prove that British cooking is as good as any in the world.' The aim is praiseworthy and the organisers are to be congratulated on their courage in backing such a culinary outsider as the traditional server of boiled cod, boiled cabbage, and boiled egg (Polish). Perhaps this will be a source of encouragement to overseas visitors. The competition is open to all who cook by gas, except professional trained cooks and employees of the gas industry. It will start locally all over the country, including Scotland and Wales, in the middle of May, will proceed to county level and then to area level. The winning county finalist in each area will come to London to compete in the finals at the Park Lane Hotel on July 10, and Princess Elizabeth has promised to come to present the prizes to the winners. For stages 3 and 4 the competitors will cook in public, and at the final Freddie Grisewood will give a commentary. Judges for the finals will be Miss Garbutt, of the Good Housekeeping Institute, Miss Smyth, the Ministry of Education Staff Inspector of Homecraft, Mr. Philip Harben of television fame, and Mr. Vincent of the Westminster Technical College. The closing date for entries is May 1.

It appears that the Gas Council is producing an illustrated book entitled *Mr. Therm goes County*, consisting of traditional county recipes, on which it was at first hoped that the competition would be based. Unfortunately, it was felt that these recipes were not in sufficiently general use to make them suitable. What a pity! Such dishes as Brotherly Love and The Miser's Feast excite the imagination, and we cherish a mind's-eye picture of a fair competitor wrestling with a Bedfordshire Clanger which, believe it or not, is a suet roll with meat at one end and jam at the other. Presumably one eats one's way solidly through from meat course to sweet.

Personal

THE Council of the Institution of Gas Engineers recently accepted with regret the resignation of Mr. John Terrace from the Chairmanship of its Gas Education Committee, of which he had been a member since its inception in 1923 and Chairman since 1937. To express their gratitude to Mr. Terrace, those who have been President since he became Hon. Secretary 15 years ago, the present members of Council, the members of the Gas Education Committee at the time of his retirement, and intimate friends joined in making presentations of a personal gift to Mr. Terrace (two Dunhill pipes in an inscribed case, together with an autograph list of contributors) and a permanent record of appreciation (an inscribed silver cigarette box to be retained by the Institution and displayed and used on special occasions).

Gas Journal Photo

The President of the Institution hands Mr. Terrace a case of pipes.

The presentations were made at the Institution on April 3 by the President, Mr. F. M. Birks, who said the name of Terrace has been associated with the Institution of Gas Engineers or its predecessors almost from their beginning. The Transactions of the British Association of Gas Managers recorded that in 1870 a David Terrace, of Leven, purchased Reports of the Association for 11s. 9d. This was, as far as they could trace, the first reference to John's father in the Transactions of the Institution.

David Terrace was in his time an eminent gas engineer in London, Leven, Glasgow, and, finally, in Middlesbrough. He was for many years Secretary and Treasurer of the North British Association of Gas Managers, and its President in 1888. He became a member of the British Association of Gas Managers in 1881, since when there had always been at least one member of his family on the register of the Institution. Mr. John Terrace's son, David, now in South Africa, was also a member, having been elected in 1940.

John Terrace had spent his early years training as a civil and mechanical engineer with Ashmore, Benson, Pease and Co., and later was appointed constructing water gas engineer with Humphreys and Glasgow, Ltd., for which Company he spent some time in Australia. He was appointed Assistant Engineer to the Tottenham and Edmonton Gas Company in 1902 and in 1909 he became Engineer and Manager of the Great Grimsby Gas Company, a position he held for 10 years. In 1919 Mr. Terrace came to London to be Chief Engineer of the South Suburban Gas Company, with which Company he remained until his retirement in 1931.

Mr. Terrace, in returning thanks, said it had been his pleasure and privilege for quite a number of years to be able to be of some little use to the gas industry. He had been in the industry all his life and he had always done what he could to help it forward.

Colonel H. C. Smith, Deputy Chairman of the Gas Council, referred to his 30 years' friendship with Mr. Terrace and said the Institution had always been fortunate in its Hon. Secretary. He recalled Mr. Terrace's predecessor, Uncle Price, who used to sit with his eyes closed and smile and exclaim: 'No, you cannot do that.' John Terrace had been equally helpful, though he had never said 'no' in quite the same sort of way; he would give a suggestion serious consideration first.

Mr. D. M. Henshaw added his testimony as the oldest contracting member of the Institution in attendance, and one of Mr. Terrace's oldest friends. He met him at Tottenham in 1902 and they had been friends ever since.

Mr. G. Sewell, A.M.I.MECH.E., Chief Mechanical Engineer of Hopkinsons, Ltd., has been appointed to the Board of the Company.

◇ ◇ ◇

Mr. A. W. Sanders, Deputy Manager at Spalding, has been appointed Assistant Works Engineer at the Ayleston Road works of the Leicester undertaking.

◇ ◇ ◇

Mr. W. P. Smith, Station Engineer at Rochdale (North Western Gas Board) has been appointed Engineering Assistant at the headquarters of the East Midlands Gas Board.

◇ ◇ ◇

Mr. F. Harvey, Engineer and Manager of the Bilston District, West Midlands Gas Board, has been appointed Group Manager of the Grimsby, Cleethorpes, and Caistor Group of the East Midlands Gas Board. His appointment follows the retirement of Colonel J. Kennington and the re-arrangement of the Lincolnshire Division.

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Mr. S. H. Stokes, Manager of the Wath, Bolton, and Thurnscoe undertaking of the East Midlands Gas Board, has been appointed Group Manager of the Scunthorpe, Brigg, Winterton, Barton-upon-Humber, and Barrow-upon-Humber Group. This appointment follows the retirement of **Mr. John Simpson,** for 29 years Manager of the Scunthorpe undertaking. **Mr. V. J. Hunter,** Deputy Manager at Scunthorpe for the past 20 years, has also resigned.

Mr. W. R. Edgar, Managing Director of William Edgar & Son, Ltd., having been in hospital for eight weeks, for an operation for osteo-myelitis, is now convalescent and hopes to return to business before the end of April.

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Mr. C. H. Noton, General Sales Manager of Fibreglass, Ltd., has joined the Board as a Director. During the last few years he has made an important contribution to the general progress of the Company. He will continue to be responsible for sales.

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Mr. A. B. Hitch, A.M.I.MECH.E., has been appointed to the staff of Brookhirst-Igranic (S.A.) Pty., Ltd., the newly-formed company which will promote the interests of Brookhirst Switchgear, Ltd., and the Igranic Electric Co., Ltd., in South Africa. Mr. Hitch, who had been at the Brookhirst London Office for several years, left for Johannesburg early in March.

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Mr. Sydney N. Duguid, J.P., B.SC.TECH., F.INST.F., F.R.SAN.I., has joined the staff of Powell Duffryn Technical Services, Ltd., and has taken charge of the branch office at 26, Corporation Street, Manchester, 4. Mr. Duguid is a member of the Council of the Institute of Fuel and Chairman of its North Western Section. He is Chairman of the National Smoke Abatement Society, Chairman of the City and Guilds Advisory Committee on Boiler House Practice, and Secretary and Treasurer of the Manchester Fuel Luncheon Club.

Mr. H. Moys, Deputy to Production Engineer, Liverpool Group, North Western Gas Board, has been appointed Production Engineer at the headquarters of the West Midlands Gas Board. **Mr. K. W. Nevett,** Labour and Welfare Officer, Birmingham District, has been appointed Industrial Relations Officer, West Midlands Gas Board, in succession to Mr. J. H. Wainwright. Other appointments announced by the West Midlands Board include **Mr. G. B. Sutton** (Atlas Insurance Co.) as Insurance Officer; **Mr. J. E. Whitfield** (Sir Lindsay Parkinson, Ltd.) as Clerk of Works, Walsall District; and **Mr. F. T. Preston** (Valveman and Relief Supervisor, Nechells) as Supervising Foreman at Nechells works.

Mr. Alfred G. Webb, Director and Secretary of the Bryan Donkin Co., Ltd., is retiring at the end of this month. He has been with the Company over 64 years. Entering the office at the old works at Bermondsey in 1885, he was appointed Secretary in 1895. In 1906 he was elected a Director. In 1935 his completion of 50 years' service was suitably acknowledged by the Company, and in 1945, on his completion of 60 years' service, the Directors presented him with an illuminated address and a cheque. He had also been Secretary of British Furnaces, Ltd., since the formation of that Company in 1925. Mr. Webb was elected a Fellow of the Chartered Institute of Secretaries in 1899.

Obituary

Mr. Thomas O. Wilton, who died at his home on March 24 in his 67th year, was Managing Director of the Chemical Engineering and Wilton's Patent Furnace Co., Ltd. He was educated at Dulwich College and London University, afterwards joining the City of London Electric Lighting Co., from which he went to the Chemical Engineering Co. in 1917. He invented the continuous process for tar distillation which is now in use by the Company. He leaves a widow and one son, who has recently joined the Company.

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The death is announced of **Mr. J. C. Wright,** for many years Engineer and Manager and later a Director of the former Romford Gas Company. Trained at the Bromley works of the Gas Light and Coke Company, where his father was Engineer, he spent several years with the West Ham Gas Company, of which he was Acting Engineer at the time of its amalgamation with the Gas Light and Coke Company. After some time as Assistant Manager of the Grays and Tilbury Gas Company he was appointed Engineer at Romford in September, 1915, and three months later became Engineer and Manager.

Mr. William I. Wood, who has died at Sunderland, was formerly Chief Clerk and Cashier with the Sunderland Gas Company. He was 87 years old and retired 20 years ago.

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Sympathetic reference was made at the meeting of the Midland Section of the Institution of Gas Engineers at Birmingham on April 6 to the death of **Mr. E. B. Tomlinson,** for many years Engineer-in-Chief of the former Birmingham Gas Department, and a past President of the old Midland Association of Gas Engineers and Managers. Following his early training with C. and W. Walker, Ltd., of Donnington, and two years as leading Draughtsman with Robert Dempster and Sons, Ltd., he went to the Windsor Street, Birmingham, works as Chief Draughtsman in 1897 under the late Mr. Charles Hunt. In 1902 Mr. Tomlinson was appointed Superintendent at the Adderley Street works under the late Mr. Harry Hack. In 1907 he became Works Engineer at Windsor Street and in 1915 he became Engineer at Nechells works. In 1929 he was appointed Engineer-in-Chief of the Gas Department and retired in 1936, when he was succeeded by Mr. G. C. Pearson.

Diary

April 12.—Industrial Gas Development Committee: Gas Industry House, 9.30 a.m.

April 13.—Scottish Junior Gas Association (Western District): Annual General Meeting and election of office bearers, Royal Technical College, Glasgow. 5.30 p.m.

April 13-14.—British Gas Staff Association: Annual Conference. Church House, Westminster, 10.30 a.m. each day.

April 17.—Institute of Fuel: 'Production of Town Gas from Weakly Caking Coals,' Dr. J. G. King, at Institution of Mechanical Engineers, Storey's Gate, 5.30 p.m.

April 18.—Manchester District Junior Association of Gas Engineers and Yorkhire Junior Gas Association: Annual Joint Meeting. 'The Use of Gas in the Cotton Industry,' W. F. S. Howell (Manchester); visit to Wigan gasworks.

April 18.—Midland Junior Gas Association and Eastern Junior Gas Association: Joint visit to Luton (Skefko Works during the morning and Electrolux, Ltd., during the afternoon).

April 20.—London and Southern Junior Gas Association: Annual Reception and Dance, Caxton Hall, Westminster, 6.30 p.m.

April 21.—Western Junior Gas Association: Annual General Meeting and Presidential Address, Exeter.

April 23.—Wales and Monmouthshire Junior Gas Association: Annual General Meeting and Presidential Address, Chepstow.

April 24.—Midland Junior Gas Association: Annual General Meeting, followed by an address; Birmingham.

April 24.—Institution of Gas Engineers (London and Southern Section): 'Codes of Practice,' A. G. Palmer, Works Regulation Officer, North Thames Gas Board, 17, Grosvenor Crescent, S.W.1, 2.30 p.m.

April 26.—North Thames Gas Consultative Council: Westminster City Hall, Charing Cross Road, 2.30 p.m.

April 27.—Manchester and District Section, I.G.E.: First Annual General Meeting, Engineers' Club, Albert Square, Manchester, 2.30 p.m.

April 27.—Northern Junior Gas Association: Newcastle. Address by J. R. Bradshaw, Deputy Chairman, Northern Gas Board. Visit to the Redheugh gasworks.

April 27.—North British Association of Gas Managers: Spring Meeting, Dunblane Hotel Hydro, Perthshire. (Golf Circle meeting, Dunblane Golf Course, April 26.)

April 28.—London and Southern Junior Gas Association: Tour of North Thames Gas Board Beckton trunk mains system and Westminster Control Room, 2.30 p.m.

May 1.—East Midlands Gas Consultative Council: Meeting. Victoria Station Hotel, Nottingham, 2.0 p.m.

May 2.—South Western Gas Consultative Council: 34, Bridge Street, Taunton, 11 a.m.

May 3 and 4.—East Midland Gas Board: Staff Conference, Skegness.

May 3 and 4.—Institution of Gas Engineers (Wales and Monmouthshire Section): Annual Meeting, Grand Hotel, Llandudno.

May 10.—Midland Junior Gas Association: President's Day.

May 11.—Northern Junior Gas Association: Meeting at Newcastle; visit to Redheugh gasworks and address by J. R. Bradshaw.

May 12.—Scottish Junior Gas Association (Eastern District): Annual General Meeting at Edinburgh.

May 15.—Eastern Gas Consultative Council: Connaught Rooms, Great Queen Street, 2 p.m.

May 16.—Institution of Gas Engineers (South Western Section: 'Some Thoughts on the Treatment and Disposal of Gasworks Effluent,' Dr. A. Marsden. Torquay.

May 18.—Institution of Chemical Engineers: 29th Annual Corporate Meeting, May Fair Hotel, London, 11 a.m.; Presidential Address, 12 noon; Annual Dinner, 7.30 p.m.

May 19.—Scottish Junior Gas Association (Western District): President's Day; Visit to Dumbarton gasworks.

May 19.—Western Junior Gas Association: Visit to the works of the Gloucester Aeroplane Co., Ltd., Gloucester.

The Trade Statistics for January, 1951, issued by the Central Statistics Office in the Republic of Ireland show imports of 21,378 tons of gas coal, valued at £101,097, against 17,810 tons, valued at £86,491 in January, 1950.

Pipe Corrosion.—The Departmental Committee on the Deterioration of Cast Iron and Spun Iron Pipes has now ceased to function, and its work is being carried on by the Sub-Committee on Buried Metals. The Technical Secretary to the Sub-Committee is Mr. E. E. White, British Iron and Steel Research Association, 11, Park Lane, London, W.1.

Sulphuric Acid Prices.—The Board of Trade has made an Order coming into effect on April 9, permitting increases on the maximum prices of sulphuric acid, due mainly to the advances in the world prices of sulphur and pyrites and of freight rates. The additions to maximum prices are 27s. 6d. per ton on weak acid (77% H_2SO_4) and 33s. 9d. per ton on strong acid (more than 84.02% H_2SO_4). Copies of the Order, the Sulphuric Acid (Prices) Order, 1951 (S.I. 1951 No. 551) can be obtained price 2d. from H.M. Stationery Office, Kingsway, London, W.C.2, and branches.

Minister Presents British Empire Medals

THE Minister of Fuel and Power, Mr. Philip Noel-Baker, acting on behalf of H.M. the King, presented, at the Ministry on April 6, British Empire Medals to a number of recipients of this honour from the fuel and power industries.

One medal awarded specifically for gallantry went to George Henry Knapp, chemical works charge-hand, North Thames Gas Board. The citation read: 'A heavy lifting gang of six workers under the charge of Knapp were working on replacing a corroded gas main which was part of an oxide burning plant used in the manufacture of sulphuric acid.

'One man stepped on to a checker plate covering a dust collector which was 3 ft. in diameter and nearly 8 ft. deep, and which was full of the sulphuric dioxide gas at a very high temperature. The centre part gave way and he fell through into the collector. Knapp leaned over and caught hold of him by the hand, but was unable to pull him out and he dropped through his hands to the bottom. A rope was sent for and Knapp attempted to lower it, but the gas in the collector was at such a high temperature that the rope caught fire. In doing this Knapp was exposed to the fumes of the escaping gas.

'In attempting the rescue Knapp was burned on both hands and affected by the fumes. He had to be forcibly dragged away in order to save him from further injuries.

'Knapp showed courage without any regard for self in his efforts to save the life of his workmate.'

Seven other gas industry awards were recorded in the New Year's Honours List in the *Journal* of Jan. 3.

News in Brief

Change of Exchange.—The telephone number of the West Surrey Division, South Eastern Gas Board, has been changed from Battersea 6401 to Vandyke 6401.

Peterborough City Council has decided to instal cookers and wash-boilers in 104 houses on the Eastfield estate and in 86 on the Crown Street estate in the ratio of 75% gas fittings and 25% electrical appliances.

A Meeting of Local Authorities in the north-east, sponsored by Hartlepool Town Council, will be held in the Newcastle City Hall on April 14, to consider what steps can be taken to secure a reduction in the Northern Gas Board's charges for street lighting.

Newcastle-on-Tyne City Council has decided not to support Hartlepool Town Council's campaign against the new gas charges introduced by the Northern Gas Board. The City Treasurer informed the City Council that from a summary of the Board's accounts it would appear that the Board had no other alternative but to increase charges.

With the Closing of Measham as a manufacturing station, the distinction of being the smallest undertaking in the Leicester and Northants. Division is now held by Uppingham. The manufacturing plant consists of two beds of eight stop end horizontal retorts, size of each retort being 22 in. × 16 in. × 10 ft. The total number of consumers supplied is just over the 600 mark.

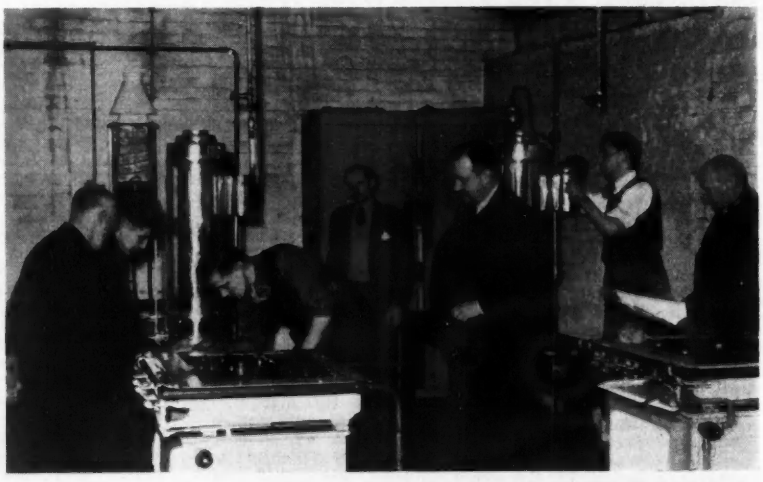
The First Annual General Meeting of the Manchester and District Section of the Institution of Gas Engineers will be held at the Engineers' Club, Albert Square, Manchester, on Friday, April 27, at 2.30 p.m. (preceded by luncheon at 1 p.m.). Mr. Thos. Haworth, General Manager of the Bolton-Radcliffe Group, will be inducted as the Section's new chairman and will present his chairman's address.

Chemical Engineers' Examination.—Particulars of the 27th Associate-Membership examination of the Institution of Chemical Engineers are now available from the Hon. Registrar, at 56, Victoria Street, London, S.W.1. Application forms are returnable not later than June 1. Written and oral examinations will be held in September, and home papers will be issued in January.

Training and Education in Wales.—The Wales Gas Board, pursuing its policy to extend educational and training facilities available for its employees, has, in co-operation with the Montgomeryshire Education Committee, arranged for further classes in Gas Fitting to be held at the Newtown Technical Institute. Students will sit the examinations in Gas Fitting held by the City and Guilds of London Institute.

Slot Gas Meters are to be supplied to each family living at Lochinvar Camp, Edinburgh, which is to be re-designed at a cost of approximately £123 per family. The camp gas bill for one year was £4,997. Other fuel costs were—electricity, £824, and coke, £68. Families in the camp pay a weekly rent of 7s. 6d. for a room, with additions of 1s. for gas for communal cooking and 6d. for gas for central heating. Additional rooms cost proportionately more. Fuel bills are paid by the Department of Health for Scotland, but the 176 families at Lochinvar cost the Corporation an average of £54 each a year for camp maintenance.

CANDIDATES AT WORK



Candidates for the current series of Practical Examinations being held under the Joint Industrial Council for the Gas Industry (Southern Area) Gasfitters' Classification Scheme. Also in the photograph are the Area Industrial Relations Officer, Mr. P. Valon Bennett (third from right) and Mr. S. H. Edwards, Chairman of the Panel of Examiners (extreme right).

Yorkshire Juniors' President's Day

VISIT TO SHEFFIELD

THE Yorkshire Junior Gas Association visited Sheffield on President's Day, Wednesday, March 14, when they were the guests of the Sheffield and Rotherham Division of the East Midlands Gas Board. A large number of members spent an interesting morning going round Neepsend gasworks, where they inspected big extensions in progress. After their tour of the works the company were entertained at lunch at the Grand Hotel, Sheffield.

Mr. E. H. Harman (Divisional General Manager, Sheffield and Rotherham Division) in extending a welcome to the juniors, said he was very sorry that the Chairman and Deputy Chairman could not be with them. He was, however, very glad to see Mr. G. E. Currier (Deputy Chairman of the North Eastern Gas Board) and also Mr. D. M. Thompson (President of the Manchester District Junior Association). At Neepsend they were trying to keep production going. Despite the extensions and alterations which were taking place, more gas was being turned out than ever before. He welcomed them all to Sheffield and hoped that they had found their visit interesting and that it would whet their appetite to come again.

Responding, Mr. D. M. Thompson said that the Yorkshire Juniors were very fortunate in having two Gas Boards in the county, the North Eastern and the East Midlands. They in Lancashire had only one, the North Western. He thought it was a great advantage having two area boards, because it enabled them to meet others to exchange views. Mr. Thompson said he would like to convey the greetings of the Manchester Junior Association to the Yorkshire Juniors and particularly to their President, Mr. S. Davies. He looked forward to the forthcoming joint visit of the two Associations to the Wigan gasworks.

Mr. G. E. Currier, O.B.E., said that he was present as a very humble member of the Yorkshire Juniors. It was always a pleasure to come into the area of the East Midlands Board. Mr. Currier agreed that the Yorkshire Juniors were very fortunate in having two boards in their area and remarked that the visits to the various works were of enormous value. Mr. Currier urged members to make full use of the opportunity now afforded to the juniors to submit papers to the Institution of Gas Engineers. He hoped they would keep this in mind. At the Autumn Research Meeting two of their members took part in the discussion. This was a wonderful chance for members of the Junior Gas Associations, and they would receive full encouragement from the Institution of Gas Engineers.

Mr. S. Davies thanked Mr. Currier and assured him that the juniors were alive to the possibilities of submitting papers to the Institution of Gas Engineers and remarked that one had already gone forward.

In calling upon Mr. S. Davies to read his presidential address, Mr. H. Dearnley (Senior Vice-President) said that Mr. Davies had the respect of each member of the Association. He had given up a lot of his time on their behalf, because he had the welfare of the juniors at heart.

In the course of his address, Mr. Davies said he was confident that the chief executives of the gas industry followed the proceedings of the Juniors very closely and he did not suppose they would wish to alter the present set-up in any way. Let them remember that many to whom he referred had passed through one or other of the junior associations and had first-hand knowledge of the excellent work being done. The Transactions were evidence of this work, and proved beyond question that the junior associations were of considerable value—indeed, essential to the industry. The future was in their own hands. They must continue to raise the standard of their meetings, with free discussion with more of the younger members taking part.

A vote of thanks to Mr. Davies for his presidential address was proposed by the Junior Vice-President, Mr. C. C. Broome.

Moving a vote of thanks to the East Midlands Gas Board, Mr. F. Firth expressed on behalf of the Yorkshire Juniors gratitude at being granted the privilege of visiting Neepsend and on being allowed to inspect all that was taking place. Mr. Thorpe, the Engineer-in-Charge at Neepsend, together with his staff of guides, were to be congratulated on the thorough way in which they conducted the parties round the works—they were efficient, informative and determined that the visitors should not lack any information with regard to processes and new developments. Sheffield had supplied some of the most enthusiastic and energetic members of their Association, continued Mr. Firth, and it was a pleasure to visit them in their home town and to see the activities and extensions which were taking place.

Mr. Harman briefly replied.

London and Southern Juniors

The 'Rating of Domestic Solid Fuel Appliances' was the subject of a paper by Dr. F. J. Eaton, of Watson House, North Thames Gas Board, at the meeting of the London and Southern Junior Gas Association on April 6. The President, Mr. T. V. Garrud (North Thames), was in the chair. This paper, together with the discussion which followed, will be dealt with in a later issue of the *Journal*.

The President announced forthcoming visits of interest. On Saturday, April 28, there would be an inspection of the Beckton trunk mains system, including the pumping plant at the gasworks, the control room at Westminster, and a display of distribution equipment. Members will travel along the line of the mains, including a short tour through one of the L.C.C. pipe subways.

It was also announced that the Association had had to change the date of the 'Ladies' Day' initially arranged for June 16, when they were to visit Windsor Castle and have a trip on the river. In view of the fact, however, that this was Ascot week and the Royal Family would be in residence, they had postponed their 'Ladies' Day' till June 30, when the programme would be the same.

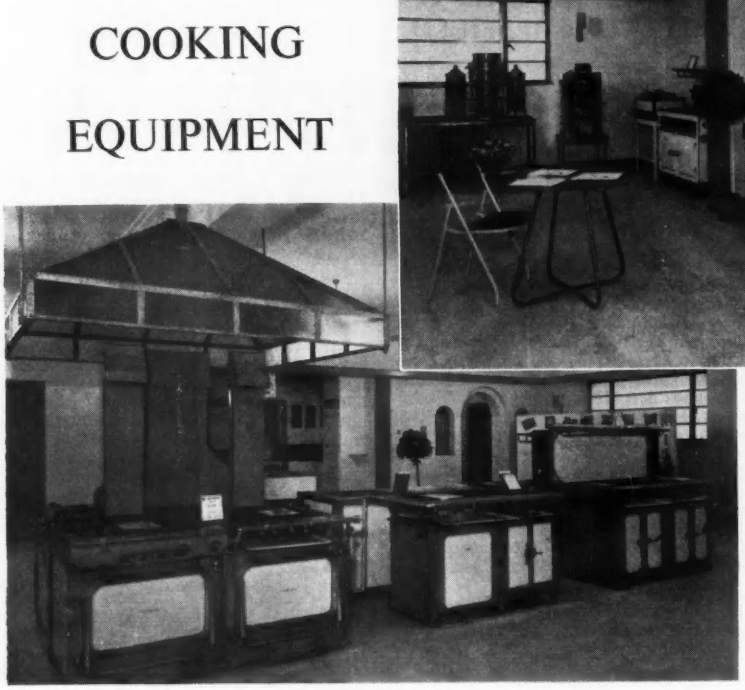
By courtesy of the North Thames Gas Board the Association visited, on April 7, the gas-making station at King's Road, Fulham, S.W.6. The production plant, consisting of a Woodall-Duckham continuous vertical retort house, a Glover-West continuous vertical retort house and a Power-Gas Corporation C.W.G. plant, has a nominal capacity of 32 mill. cu.ft. of gas per day. The visit embraced an inspection of these production units and, in addition, steam raising and power plant and a gas booster installation.

A Novel Hobby

Mr. B. H. Moore, South of England Area Sales Manager of George Wilson, Gas Meters, Ltd., has an unusual hobby —*i.e.*, the building of model radio controlled aeroplanes.

The wing span of the plane is 6 ft., weight 4½ lb., and the model is powered by a 10 c.c. spark ignition engine, swinging a 14-in. propeller. The model is now completed and fitted with radio control, giving a rudder and aileron movement, and also a motor cut out. The effective range of the transmitter is up to two miles.

LARGE SCALE COOKING EQUIPMENT EXHIBITION AT FOLKESTONE



AN exhibition of large scale cooking equipment was opened on January 29 last in the Folkestone showroom of the South Eastern Gas Board in co-operation with Radiation Ltd. A comprehensive selection of modern appliances was presented to hoteliers, restaurant keepers, and others concerned in the catering industry. The many visitors, some of whom came from as far afield as Herne Bay, Ramsgate, and Tunbridge Wells, were able to watch the preparation of specimen dishes by a local chef and to receive suggestions on the equipment most suitable for their individual needs from two representatives of the appliance manufacturers and from the Board's adviser on the planning of large kitchens. Although the exhibition was originally planned to run for three weeks only, it has been so successful that it has remained open, and consideration is being given to making it a permanent feature of the showroom.

Crewe Mainlaying Feat

A remarkable mainlaying operation, carried out at Crewe Junction for the North Western Gas Board has just been completed. More than 200 yards of 24-in. diameter gas main have been laid under 40 close-packed sets of railway lines across the width of Britain's biggest railway junction without once disturbing train timings.

The main will eventually carry urgently needed supplies of gas to the works of British Rollmakers Ltd., adjoining Crewe Junction when the Gas Board's projected new production plant is erected at Crewe.

To allow regular running of passenger and goods traffic over the lines, the work had to be carried on day and night to a close time schedule.

Thanks to the co-operation of British Railways with the Gas Board, the work went on unhindered by passing trains although engine speed limits over the excavations had to be imposed when necessary.

Originally expected to take 12 weeks, the operation was completed three weeks under scheduled time. To cover all risks while the work was proceeding, special short-term insurances to a total of £350,000 were taken out.

Haldane Essay Competition

The Institute of Public Administration has invited public officials in the British Commonwealth to enter the essay competition for the Haldane Prize of £10 and a silver medal, which is awarded annually to the writer of the essay regarded as the most useful contribution to the study of public administration. Additional prizes of £3 3s. are paid for any other essays which are published in the Institute's journal.

The judges of this year's competition will be Sir Arthur Rucker, K.C.M.G., C.B., Deputy Director-General, International Refugee Organisation, and formerly Deputy Secretary of the Ministry of Health, and Professor S. E. Finer, M.A., Professor of Political Institutions at the University College of North Staffordshire.

Competitors may choose any subject within the field of public administration, although they should deal particularly with the administrative aspects of the selected subject. The closing date for entries is August 31.

All essays must be submitted under a *nom-de-plume*. Those proposing to enter should obtain copies of the competition rules from the Institute.

Lanarkshire Visit

Mr. Douglas D. Burns, Deputy Chairman of the Scottish Gas Board, made a tour of the number of gas undertakings in Lanarkshire on March 29, and with Mr. Fred R. Mitchell, Manager of the Lanarkshire group, reviewed the progress being made in the country's gas grid plan.

Among undertakings visited were the works formerly owned by the County Council at Uddingston and Cambuslang, and Hamilton, Strathaven, and Lesmahagow gasworks.

Linking-up of the undertakings into a grid system will avoid the necessity of duplicating standby plants at the various works. In the event of breakdown gas will be provided from other works with a surplus. The scheme will effect a considerable saving in capital expenditure contemplated under the old system.

Mr. Mitchell said that attention was being given to improvements in the service from the consumers' point of view and that improvements at certain works were also under consideration.

A major development was planned for Uddingston, some additions were to take place at Coatbridge, and additions at Motherwell were nearing completion.

HARMONY AT OXFORD

THE happy relations existing in the Oxford and District undertaking of the Southern Gas Board, and the energetic way in which difficulties are being surmounted were stressed at the annual dinner of the undertaking at Oxford.

The dinner, attended by over 200 people, was presided over by Mr. S. C. Bentley, Engineer and Manager, and among those present were Mr. S. E. Whitehead, Deputy Chairman of the Southern Gas Board, Mr. T. E. D. Mason, Secretary of the Board, Mr. A. R. McBain and Mr. S. V. Smith, Members of the Board, and Mr. Alexander Tran, Divisional General Manager, Northern Division, Southern Gas Board. Mr. Owen R. Guard, Chairman of the Board, was unable to be present.

Mr. Whitehead, proposing the toast of the undertaking, said they had been very glad to have the Oxford undertaking in the organisation of the Southern Board when the original reorganisation took place, and were still very strongly of that opinion.

Mr. Bentley, responding, said that since they met a year ago they had largely carried out many of the changes at which he had then hinted. It had been a great relief to hear of the laying of the main from Reading. The sports club membership was now about 450 and plans had been made for a children's party and an outing for pensioners.

Mr. Tran, proposing 'The Southern Gas Board,' said that in the two years under nationalisation they had made excellent progress throughout the area, and he was satisfied that the Board was second to none in the country.

Mr. Smith, responding, spoke of the amicable industrial relations in the area. There was an intense desire to further the interest of the consumer, he said, coupled with the desire to ensure that everyone should get a square deal in proportion to his contribution.

First Smokeless Zone

According to a report in the spring issue of *Smokeless Air*—journal of the National Smoke Abatement Society—Britain's first smokeless zone, a 30 acre area in the centre of Coventry, came into being on March 1, 1951. There had earlier been some doubt about whether a postponement might be necessary, but in view of the fact that the small amount of bituminous coal used in the area had considerably decreased since the zone was planned in 1947, it was decided to proceed. Of the 179 premises in the area 170 are of a business nature, with only a few caretakers' flats and other domestic premises.

The Coventry Act under which the smokeless zone has been set up allows for extensions, and ultimately it is hoped that the whole city will be covered. The authorities do not, however, anticipate any great extension within the next few years.

Salford City Council has approved the terms of an Order creating smokeless zones in the Lower Kersal, Weaste, and Duchy Road areas, and Ministerial confirmation is now being sought. The Order excludes from the first of the three zones the boiler house of the Prestwich works of the Bradford Dyers' Association. With the Order is a schedule defining the three areas.

The installation of appliances suitable for smokeless fuels in the corporation's pre-war houses and flats in the smokeless zones is being financed by the corporation. The total of £16,000 includes the conversion of 1,497 coal-burning grates, the provision and installation of 45 gas cookers. Assistance of up to £2 per house is also proposed for private householders requiring to make alterations.

Revised Tariffs are announced by the Eastern Gas Board to come into force from the next meter reading. The notice giving effect to the revision indicates that regard has been had to recent increases in the price of coal, gas oil, other materials, and wages.

CHEMICAL SOCIETY RESEARCH

The Research Fund of the Chemical Society provides grants for the assistance of research in all branches of chemistry. About £700 per annum is available. Applications for grants will be considered in November next and should be submitted not later than May 1. Applications from Fellows will receive prior consideration. Forms of application and further particulars may be obtained from the General Secretary, the Chemical Society, Burlington House, Piccadilly, London, W.1.

Gas for Good Health

Halesowen Exhibition

The health of the community is everyone's concern, and any effort to reduce disease, infection and illness deserves general support and official review. The gas industry was well in line with other local services in stressing the modern drive for better health in a Health Exhibition at Halesowen from March 13-17.

In the confines of the 60 sq. ft. allocated, the Halesowen District of the West Midlands Gas Board built a three-sided fascia which, decorated in cream with grey lettering and red lines, made a clean-looking background to the gas exhibits. With these exhibits the health motif was implied rather than openly stated.

The Electrolux L.300 refrigerator connoted food preservation. The Ascot 503 with its instant hot water supply was a healthy hint for clean hands and domestic first aid. 'Click! Clean heat in a tick!' was the slogan over the 'Serene' fire, announcing the claim of gas for healthy, instant, ventilating heat just as the 'Sofono' coke fire supported the smokeless fuel campaign for a purer atmosphere.

But perhaps the modern gas appliance best expressive of good health was the 'New World' 1840 cooker. By a mental comparison with the old black cookers it was obvious that an appliance with these smooth sides, easy-clean oven and top bars, a crown plate accessible to a brisk scrubbing was an appliance offering no clinging place for dirt and germs. In fact, the modern gas cooker is entirely at home in a health exhibition.

BIG NEWCASTLE GATHERING

Miss D. McCall (Newcastle Division), outlining the new season's programme of lecture-demonstrations to a gathering of women's organisations in the Old Assembly Rooms, Newcastle. No fewer than 650 executives, representing 172 women's organisations, were present.

CONSULTATIVE COUNCILS IN SESSION

Why Subsidise Public Lighting?

NORTH THAMES COUNCIL SEEKS EXPLANATION FROM BOARD

THE North Thames Consultative Council, meeting on March 29 at the Westminster City Hall under the chairmanship of Councillor Edwin Bayliss, J.P., drew attention to the fact that gas for street lighting in the Board's area was being sold at an uneconomic price, which meant that it was, in effect, a subsidised load.

The discussion arose following an explanation of the Board's first report and statement of accounts given by Mr. O. W. Wells, A.C.A., the Chief Accountant. It was understood that the lowest price at which the Board could sell gas with a reasonable margin of profit was in the region of 11d. per therm, whereas the price for public lighting was 7.06d. per therm. Some criticism was levelled at this subsidising of the public lighting load at the expense of other classes of consumer.

It was pointed out that many public lighting contracts were fixed on a long-term basis which were inherited from the former gas undertakings, and if they could not be renewed at an economic figure they were being dropped. The public lighting load was only 1.64% of the total, and the price per therm sold was computed after allowing for direct expenditure on maintenance, etc. It had, moreover, some value as an off-peak load as well as some 'prestige' value. In this latter connection it was suggested that the loss should be charged to publicity. The load was not very attractive under present-day conditions, it was stated, and was definitely unattractive in times of heavy demand and reductions of pressure.

It was decided to call the Board's attention to the Council's views on the subject and to seek further explanation.

Allocation of Reserves

Mr. Wells gave the Council some information as regards the allocation of provisions and reserves which were inherited by the Board on vesting day, the grand total of which was approximately £11,464,000. The provisions for renewals were no longer required as the nationalised gas industry had decided to deal with all tangible property such as works, mains, showrooms, etc., on the normal commercial method of providing for the reduction in value due to wear and tear by means of a charge for depreciation instead of charging to revenue the cost of renewals as and when they arose, or by means of equalisation. This latter method, said Mr. Wells, was known as the renewals method and was the common practice of the large majority of gas companies.

There was one fund which did not fall easily into any classification—and that was the special purposes fund. This fund was authorised by statute, annual contributions to it being generally limited to a percentage of the paid-up capital. The maximum amount of the fund was equally limited, and the usual purposes for which the fund could be used were expenses incurred by reason of accidents, strikes, or circumstances which due care and management could not have prevented and expenses incurred in the replacement or removal of plant or works other than expenses requisite for maintenance and renewal of plant and works. The Gas Light and Coke Company, which represented some 80% of the Board's business in terms of gas sold, used the fund to carry its own insurance risks and only insured special risks and excesses in the insurance world. The Board had decided to follow the practice of the Company and extend it to cover the whole area. Thus the balance on the fund at vesting date had now been described as an insurance reserve and would be used to meet losses which might arise in excess of internal premiums which were charged to revenue account.

Long and Intricate

The clearing up of the position of provisions and reserves had been long and somewhat intricate. While the Gas Council had desired uniformity, the position of individual Gas Boards had varied considerably. Some had a negligible interest; but the North Thames Board with the largest interest, had done its utmost to keep as much as possible available for known liabilities whether actual or estimated, for the immediate benefit of consumers. Mr. Wells said there was no need for him to point out that if a charge had to be made to revenue instead of to a provision account the price of gas must be affected adversely.

Projects estimated at over £3¼ mill. were announced by the Chairman. These include the erection of three new gasholders of a million cu.ft. capacity and each costing £122,500 at Dawley, Grays, and Pinner. A further battery of coke ovens and ancillary plant—the fifth—is to be be built at Beckton gasworks at a cost of £1,580,000. Five new colliers of 4,600 tons and two of 2,650 tons will account for £1,578,160, while additional coal-stocking plant at Beckton will cost £250,000. The Chairman also reported that a new carburetted water gas plant at Beckton costing £1,039,000 will go to work in the autumn, with a capacity of approximately 18 mill. cu.ft. of gas per day.

Further business by the Council included a decision to open its own banking account, so that it could in future transact its own financial business. Such account would be supported by a periodical vote from the Board—in which connection some members suggested that it was invidious to be financed by the Board whom it might on occasions be their duty to criticise or oppose. It was pointed out, however, that there was a statutory obligation upon Gas Boards to finance their consultative councils, and it was more convenient for this to be done through an independent banking account.

Change in Shillings

Satisfaction was expressed at the Board's action in providing change in shillings at their showrooms, and it was reported that at the Slough showrooms alone, 200 consumers per week were taking advantage of the facility so offered. It was felt that employers of labour could assist in the better circulation of shillings by including them in wage payments, and the Chairman appealed to members of the Council to help forward this idea.

Matters relating to publicity in various aspects were discussed and the Chairman promised to submit them to the Board for examination. The Council also considered methods of making their functions and the names of local representatives on their District Committees more widely known. An interesting representation from a consumer at Richmond relating to the stocking and sale of coke in 28-lb. bags was accepted and passed to the Board for consideration.

The next meeting of the Council will be held at 2.30 p.m. on Thursday, April 26, at the Westminster City Hall.

Hire Purchase in the Southern Area

ALDERMAN J. W. MOORE (Chairman) informed the Southern Gas Consultative Council at its quarterly meeting at Reading on March 28 that the Board had been considering the question of hire purchase from the point of view of the consumer who, having paid a number of instalments, wished to pay off the balance. Mr. J. T. Haynes, Divisional General Manager of the Western Division, had reported that it had now been found possible to arrange for a discount calculated at the rate of 2½% for each full year to be allowed in respect of instalments paid before they were due. Thus, on paying off a balance which still had 2½ years to run the consumer would receive 2½ times 2½%, a total of 5⅝% on the whole of the balance due.

Alderman Moore said he felt such an arrangement offered some encouragement to consumers to pay off as soon as they could. Mr. Haynes had thanked him for calling attention to the matter. He thought it was an instance of the usefulness of the consultative council.

Reference was made to a resolution

passed at a previous meeting urging the desirability of removing purchase tax from gas water heaters. A copy of the resolution had been sent to the Southern Electricity Consultative Council, who had agreed to support the agitation for tax relief. No definite reply had been received from the Ministry of Fuel and Power, to whom the resolution had been forwarded.

The Chairman referred to correspondence which had passed between the Council and the Portland Urban District Council on the question of charges for gas street lighting. Before nationalisation the gas undertaking was owned by the Portland Council, and there was an agreement between the departments concerned as to the charges to be made for gas used for public lighting. The matter had been taken up with the Consultative Council, but the latest development was a letter stating that the Portland Council did not wish to trouble them any further as they had decided to take the matter direct to the headquarters of the Southern Gas Board.

Apart from the question of uniform prices for coal and gas, to which editorial reference was made last week, the only other matter was a reference to the posters which had been produced with a view to informing consumers as to the facilities provided by the Consultative Council and its local committees for raising questions or complaints about gas supplies. The posters, said the Chairman, had now been widely displayed throughout the area.

North Western Tariffs Simplified

82 PRICE INCREASES; 17 PRICE REDUCTIONS

A FAR reaching revision of gas prices and tariffs which will level out considerably the present multiplicity of charges in the north west and greatly simplify methods of charging was announced at a meeting of the North Western Gas Consultative Council on April 6.

As a first step towards area-wide unification of prices, which is the Board's declared aim, standard group prices and tariffs have been established within eight of the 17 groups into which the Board's 103 undertakings have been divided. In another six groups there are standard group tariffs with special differentials applying to a few undertakings, and in the three remaining groups, although the districts supplied by each undertaking will continue to have separate tariffs, these have been greatly simplified and follow a similar pattern.

As a result of the levelling principle followed the burden of the price increases will be felt differently in different parts of the north west. Where exceptionally low rates have been enjoyed in the past the new prices will mean heavier increases in gas bills than in districts where higher rates have existed.

Domestic gas prices in the areas of supply of 82 undertakings are to be increased, and there will be 17 price reductions. The price increases range from 0.15d. per therm at Radcliffe to 4.3d. per therm at Burnley, and the price reductions from 0.11d. per therm at Glossop to 5.19d. per therm at Westhoughton.

As a result of the revision, gas sold throughout the area will cost consumers an average of 1.25d. per therm more. The new charges will come into force after the first meter readings following May 1.

The following measures will apply throughout the Board's area:

(1) Cash discounts will be abolished.
(2) Outer area differentials will be abolished.
(3) Metering charges will be standardised at 2s. per quarter or for prepayment meters at 1d. per therm.
(4) Where rented cookers are supplied to prepayment consumers the cost of gas will include a supplemental charge of 1½d. per therm.

Heavy increases in the costs of coal, oil, materials, equipment, transport and labour since 1949, when 37 price changes were made, have necessitated the new tariff revision. It is pointed out that but for these increases in costs outside the control of the Board the substantial economies achieved through increased plant efficiencies and better organisation of staffs would have made it possible to reduce instead of increasing prices.

Appointments

Alderman W. V. Collier (Warwick), Alderman W. Piggott (Hereford), Councillor E. T. Hobley, (Rugby), Councillor C. Lowe (Wellington), and Mrs. K. Newbould (Redditch) have been appointed members of the West Midlands Gas Consultative Council.

Councillor Evan Evans, J.P. (Guilford Street, Russell Square), has been appointed a member of the North Thames Gas Consultative Council.

De La Rue Exhibition

Thomas De La Rue and Co., Ltd., will hold an exhibition of their products at the galleries of the Royal Society of Painters in Water Colours, Conduit Street, W.1, from July 2 to 19. This will be the first time that products representative of all the Company's activities in security printing, stationery, plastics and the gas industry have been brought together under one roof.

Exhibits of historical interest from the Company's own museum will help to tell the story of development from early Victorian times, and among the articles shown will be several which were on display at the Great Exhibition of 1851, when the business had already been in existence for nearly 40 years. From the factories of the Industrial Group there will be examples of work in laminated and extruded plastics, and gas appliances.

Admission to the exhibition will be by invitation. The Industrial Division will be open to visitors from July 5 to 19.

De-Rating Protest

At a meeting of the North Eastern Area Council of the National Chamber of Trade at York, on April 4, a protest was made against the de-rating of retail premises occupied by nationalised industries. Alderman W. Barber, of Halifax, said that there was no objection to the de-rating of generating stations, which were similar to factory premises, but there was strong objection to concessions for showrooms.

Mr. H. J. Jackson, Secretary, said that the North Western Gas Board were now demanding that all their premises should be reduced by 75%. This was being opposed by Chester City Council as being unfair to the rest of the ratepayers. Rating in the case of nationalised undertakings was not dealt with under the ordinary rating Acts, but by special legislation which no one appeared to have heard about, and they would not be brought before the ordinary rating panels.

The resolution, passed by the council, viewed with alarm the preferential rating treatment which appeared to be allowed to the nationalised gas and electricity boards' retail premises and called for a full investigation.

Newspaper Press Directory

When the *Newspaper Press Directory* was produced by Charles Mitchell in 1846 (just three years before the birth of the *Gas Journal*), it was the first publication of its type to provide a complete guide to British newspapers. Control of the *Directory* passed from C. Mitchell and Co., Ltd., in 1949 to Benn Brothers, Ltd., who have just published the Centennial Issue (42s., postage extra). During the life of the *Directory* the British Press has grown from 550 to more than 5,000 newspapers and periodicals, and it is not without some personal pride that we note that the *Journal* is among the half dozen oldest of the exclusively technical publications listed in the book. There are 1,534 newspapers and 3,611 periodicals and magazines; in addition, many, but by no means all, of the house magazines now published are listed, and for the first time a separate section records nearly 1,000 directories and year books.

The Gas and Electricity Industries were criticised at the annual meeting at Newcastle of the North of England Shipowners' Association for building up their own collier fleets. Mr. D. N. Robinson, of North Shields, agreed that both industries were entitled to have their own fleets if they wanted, and he agreed that the ordering of colliers had provided work for the shipyards. There was another side to the question, however. Private firms which had built up their coasting business were being seriously hampered, if not driven out of business. Mr. Robinson said that before the war, the shipping needs of the public utility companies had always been met, and he thought that this system should have been continued.

Experiment in Budgetary Control

Southern Gas Board Accountants' Conference

A NEW departure in area board staff conferences was a conference of accountants of the Southern Gas Board held a few weeks ago at Southampton, of which we have received a full report from Mr. J. M. S. Risk, Chief Accountant. The conference was convened: (1) To discuss arrangements for completing the annual accounts and other matters; (2) to discuss an accounts manual designed to further comparability of accounting records; and (3) to foster an area outlook and enable group accountants and others to express their ideas and exchange views on common problems.

Mr. Risk's introductory talk dealt with the progress on accountancy work since vesting day and current and future accounting tasks. The speaker also dwelt on the need for careful planning of clerical work and on the accounting requirements of management which he suggested should include:

Accounts relevant to their purpose.
Strict comparability.
Prompt presentation.
Accounts prepared at frequent intervals.
The maximum degree of accuracy, subject to prompt presentation.

The Chairmen of succeeding sessions introduced the various subjects so as to give delegates a clear impression of what was to be discussed, and how the sessions would be organised to make maximum use of the available time.

The opening session was short so as to enable those attending to spend a few minutes getting to know each other before the main part of the conference started the following day. The opening session was held relatively late in the evening to enable accountants to do their normal day's work, before setting off for Southampton. Next morning, the conference was addressed by the Chairman and Deputy Chairman of the Board.

A Working Conference

Mr. Owen Guard said that on principle he was not always in favour of conferences, but this was a working conference which was going to get down to hard work. The Board was accountable to Parliament and the figures presented to the Minister were, in fact, the accountants' figures. Collectively and individually they carried a heavy responsibility and it was essential that the Board should have implicit faith in the figures that they produced. He wanted the accountants always to remember that responsibility and particularly to pass it on to the younger members of their organisations so that they, too, might realise that the positions they carried were important and were positions of trust.

We were living in an age of specialisation, which was probably the right approach to modern commercial problems, but care must be taken that 'specialisation' was not mistaken for 'isolation', as sometimes seemed to be the case in large organisations. Isolation would be disastrous in an organisation like theirs and he asked them to keep that fact well in front of them as they went about their daily duties. Regarding specialisation he would encourage every young man coming into the organisation to make every effort to qualify as an accountant. In years to come it might well be that the industry would have room only for qualified men.

Referring to budgetary control, which was being tried out with the full co-operation of the Bournemouth undertaking, he took full responsibility for introducing the system into an industry which, so far as he understood, had not used it before. Such a step was always a gamble, and he appreciated not only what Messrs. Robson Morrow had done but the interest and co-operation they had received from accountants, engineers, and all those concerned with that new development. For his own part, for a number of years he had had implicit confidence in budgetary control, not as a conglomeration of figures, but as a vital tool of management. Like any other tool, if it was found to be unsuitable or unworkable, it must be discarded and superseded.

Mr. S. E. Whitehead, Deputy Chairman of the Board, in associating himself with Mr. Guard's remarks, said that while accountancy was an integral part of management there were one or two matters that should be mentioned from the gas engineer's point of view. Accountancy could be divided into two parts—the balance sheet and the trading account. It was the latter that vitally affected engineers and managers who depended on the accountant for their figures of costs and results.

In his view three aims should be kept in mind; first, that the information should be in the form of actual costs and results; secondly, they should be available as quickly as possible; and thirdly they should be truly comparable both with the preceding period and as between divisions, groups, and units. He suggested that in an old industry such as gas, they should pay regard to tradition and ensure that the results were of full use to people trained to use older systems.

Manual of Accounts

The main purpose of the second and third sessions was to introduce and discuss the manual of accounts, which it had not been possible to circulate before the meeting.

(At any future conference, it is hoped to circulate all papers and documents at least a week before discussions take place.)

The morning session was composed of three parts. Firstly, Messrs. Black, Manser, and McLeod introduced the manual, after which an hour was allowed for discussion in four divisional groups, each consisting of about six accountants from the same divison. Finally, a spokesman from each group voiced the queries on which his group wished further discussion.

During the lunch interval, the Finance Committee sifted the various queries and selected six of them for discussion in the afternoon.

The agenda for the afternoon session provided for discussion in four panels, arranged to bring together those from the 'Big 5' units (two panels) and those representing the smaller groups (two panels). It was tightly scheduled and the proceedings were carried through as planned, although a degree of flexibility was necessary towards the end of the session.

Taking each problem in turn, Mr. Risk introduced the subject and ten minutes was allowed to each panel to discuss the point among themselves.

A spokesman from each panel then gave the views of his panel on the point in question. A short time was allowed for general discussion, including the views of divisional accountants, who were not part of the panels. This discussion cycle occupied 35 minutes and four problems were dealt with in this way.

In one or two instances, there was time to obtain the views of each panel and then to allow a further short period of panel discussion so that the members of the panels could review their first thoughts after hearing the views of their colleagues.

The problems related to the code of accounts, the analysis of coal charges, 'composite expenses' and transport accounting.

Perhaps the most important of the problems brought forward related to coke transactions, and in view of its importance, the remainder of the session was devoted to it.

A Successful Method

Mr. W. H. Haddleton described in detail the relevant section of the accounts manual. Twenty minutes were allowed to each panel for discussion.

Mr. Haddleton then acted as Chairman and took the section of the manual paragraph by paragraph, and agreement was reached on all major points. In a few cases, amendments to the manual were agreed.

It can be said that this method of dealing with major problems was markedly successful. Concentration on specific problems was maintained and the level of discussion was of a uniformly high standard.

Although it is difficult to provide a detailed record of the afternoon discussions, this session may well have been the most fruitful from the accountants' point of view, as it provided an opportunity for all the group accountants to express their views on a number of important subjects.

It has been generally agreed that the close scheduling of the discussions was successful, but some delegates have suggested that a litle more time for general discussion would be appreciated.

The first session on the third day dealt with budgetary control, and Mr. Haddleton gave a concise explanation of the basic principles. The speaker used the running of a private car for his illustration and, by means of a specially prepared blackboard, demonstrated the successive steps in establishing the system.

He aroused keen interest, which was maintained by Mr. Wilkes, who went on to describe the successive stages by which budgetary control was being introduced at Bournemouth.

In view of the interest created, it was decided to extend the time allotted to the subject and a valuable discussion took place, during which questions were answered by the two speakers, Messrs. Manser and McLeod, of Robson Morrow & Co.

Mr. W. Bailey, the Chief Accountant of the Gas Council, attended this session and joined in the discussion.

Internal Check

The concluding session was devoted to internal check, Mr. Dunster being the main speaker. The time for discussion was brief, but it was clearly an important subject from the group accountants' point of view, and one which should be dealt with more thoroughly on a future occasion.

Mr. Risk expressed the thanks of the conference to the various speakers who had taken so much trouble to prepare papers for discussion.

He then asked for the views of the delegates on a number of matters and it was unanimously agreed:—

(1) that the thanks of the delegates be conveyed to the Board and Management Committee for arranging the conference.

(2) that the draft manual of accounts submitted to the conference be accepted as the basis for establishing uniformity of accounting practice.

(3) that the members of the conference record their keen interest in the budgetary control experiment at Bournemouth and hope that there will be an opportunity of discussing the subject further when the installation at Bournemouth was complete.

(4) that the members of the conference were acutely aware of the need for adequate and comprehensive systems of internal check.

(5) that the members place on record their appreciation of the work done by all those concerned with the production of the manual of accounts and their thanks to those who had given papers at the conference.

(6) that Mr. Haddleton's elucidation of the basic principles of budgetary control be reproduced and circulated.

(7) that the members felt that the conference had achieved the purposes for which it was convened and considered that similar conferences would be helpful when specific problems had to be discussed on an area basis. It would be for the finance committee to consider if and when there was need for such a conference and to make an appropriate recommendation to the Board through the management committee.

The members of the finance committee endorsed these recommendations.

Physical Society's Exhibition

REVIEW OF THE STANDS

THE Physical Society's 35th exhibition of scientific instruments and apparatus opened at Imperial College (Imperial Institute Road and Huxley Building, Exhibition Road), South Kensington, S.W.7, on April 6; it closes today.

As in previous years, the exhibits were full of interests and wide in range, achieving a subtle balance between the research exhibits by various Government departments, universities, and other research bodies, and the displays provided by commercial firms. Among the latter, quality of workmanship, British ingenuity of design, and the application of physical methods for the solution of problems previously solved by chemical or other means, were never displayed to better advantage. It is to certain of these commercial exhibits that the following notes refer, and it is our intention to select items of particular interest to the gas industry, either because of their application in the industry, or because they may be of purely academic interest to the industry's research and other workers.

The Research Laboratory of the **British Thomson-Houston Co., Ltd.,** showed the following instruments: An X-ray texture mapping camera; infra-red detectors, which are a practical form of lead sulphide photocell for use at liquid air temperature with shielding from room temperature radiation; a high voltage ignitron, which is a water-cooled steel envelope ignitron designed for power rectification; a 100 kv. r.m.s. capacity divider, which is a variable ratio oil-filled instrument for use on voltages up to 140 kv. peak; a 100 kv. 50 c/s. peak reading voltmeter; and several other instruments.

On this occasion the **Cambridge Instrument Co., Ltd.,** exhibited only apparatus appropriate to physical chemistry including various forms of gas analysis apparatus on the thermal conductivity and magnetic principles; all instruments were demonstrated.

Most undertakings dry their gas before distribution to prevent condensation in the mains, and for this reason an instrument for determining water vapour in coal gas, incorporating a differential katharometer, is of interest. An air-gas ratio recorder for furnaces and other gas-fired equipment, and indicator for the measurement of the concentration of organic vapours in solvent recovery plants and the detection of leaks, a recorder for dissolved hydrogen in boiler condensate, a potentiometer with an electronic null-point indicator for gas analysis and temperature measurement by unskilled personnel, were among other exhibits shown.

Cinema-Television, Ltd., showed an R.C. oscillator and automatic frequency monitor, a square wave and pulse generator, a mutual and self-inductance bridge, a wide range capacitance bridge, adjustable phase correction units, an electronic frequency meter, and several other types of apparatus.

Elliott Brothers (London), Ltd., exhibited the following instruments: An Elliott-Shotter inductive system of remote indication, an ultra-high speed cathode ray oscillograph, a strain-gauge for the measurement of compressive loads, micro-wave swept frequency impedance meter, a magnetic modulator, an 'Elliottrol' calibrated pneumatic controller which introduces integral and first derivative control functions into an automatic control system and which has calibrated dials by which the associated time constants may be set, and a 'DCL-Elliott' magnetic oxygen analyser.

A selection of servo and other fractional horsepower motors for D.C. and A.C. was exhibited by **Evershed & Vignoles.** Those arranged with servo mechanisms have a high torque/inertia ratio. Some of the motors include generators for providing a damping component proportional to speed so as to increase stability and avoid hunting. The generators in the D.C. machines are of the permanent magnet type giving the minimum of ripple, while on the A.C. machines they are of the drag-cup type having therefore minimum inertia. Other instruments shown included 'Megger' insulation testers, earth testers and earthometers, and a new quick response recorder.

The Research Laboratories of the **General Electric Co., Ltd.,** exhibited the following apparatus: Diamond wire-drawing dies, part of the bore of which may be pierced with an electric spark; apparatus for the measurement and control of the thickness of thin metal; recent developments in crystal valves; barium titanate resonator elements, a voltage-controlled swept frequency oscillator, a high-frequency bridge with continuously variable ratio arms, (³)V.H.F. impedance matching and measuring equipment, and fixed vacuum capacitors.

Nash & Thompson, Ltd., showed six main instruments which may be listed as follows: A high pressure recorder, a furnace controller which by means of electrically-operated valves, can control gas and steam furnaces; a Bibby recorder, a glossmeter designed by the Paint Research Station, and a paint thickness meter.

Southern Chairman for Midland Section

Record Increase in Membership

MR. ALEXANDER TRAN, Divisional General Manager, Northern Division, Southern Gas Board, was inducted as Chairman of the Midland Section of the Institution of Gas Engineers at the annual general meeting at the Queen's Hotel, Birmingham, on April 6. There was one of the largest attendances in the long history of what was formerly the Midland Association of Gas Engineers and Managers.

Mr. K. L. Pearce, the outgoing Chairman, said that since the last meeting 125 applications for membership had been received from new and re-joining members. In view of the large number it was impracticable to read their names or to greet them individually but he extended a hearty welcome to those of them who were present and hoped they would attend on every possible occasion.

The annual report and accounts, which had been circulated, were unanimously adopted on the proposition of Mr. S. J. Sadler, seconded by Mr. C. M. D. Belton.

Sympathetic reference was made to the death during the year of Mr. A. Blakemore (Ledbury), Mr. R. J. Milbourne (Wellington), and Mr. E. B. Tomlinson, for many years Chief Engineer of the former Birmingham Gas Department, and a past President of the Association.

The names of the successful students in the Institution of Gas Engineers Higher Grade Examinations were announced.

The Chairman said it was their custom to present certificates to the successful students at the autumn meeting. The certificates were received too late for presentation at the last meeting and he had felt it desirable not to withhold them until the present meeting but to forward them to the winners with an appropriate letter expressing the congratulations of the Section.

New Officers

On the proposition of Mr. W. A. Pask (Leicester) seconded by Mr. A. B. Britton (Hinckley), the meeting comfirmed the following appointments for 1941-1952 on the recommendation of the Management Committee: Chairman, A. Tran; Immediate Past Chairman, K. L. Pearce; Senior Vice-Chairman, J. E. Wakeford; Junior Vice-Chairman, W. MacNaughton; Hon. Secretary, J. Corrigan; Hon. Treasurer, J. H. Wainwright; Auditors, A. Facer and S. Bentley. Ordinary Members of Committee, 1951-1954: S. J. Sadler (Solihull); C. C. Wood (Leicester); F. Harvey (Bilston).

Mr. J. Corrigan, Hon. Secretary, presented the scrutineers' certificate of the result of the ballot for election to membership of the Section of those qualified as Associates of the Institution of Gas Engineers.

Mr. Tran was elected to serve as a District Member of the Council of the Institution, and Mr. Pearce was nominated as an Ordinary Member of the Council.

It was unanimously agreed to continue the contribution of 50 guineas to the Benevolent Fund of the Institution.

Need for Support

Mr. G. E. Currier, Junior Vice-President of the Institution, expressed thanks for this generosity. He said that at a recent meeting in London of the Benevolent Fund Committee concern had been expressed at the fact that for the first time for a number of years less than 50% of the members of the Institution had contributed individually. The numof cases receiving assistance was about the same as it was 10 years ago, but the amount given was nearly doubled. It would be appreciated that in these days of inflation such an increase was very necessary and the Committee was very worried as to the future. Not only were fewer than 50% of the members contributing, but of the total contributors only 40% were doing so under deeds of covenant. He urged as many members as possible to adopt this system of contributing in order that the Benevolent Fund might derive the considerable financial assistance of the repayment of income tax on the amount contributed.

It had been suggested that in the new welfare State there should be no need for such a fund but in fact there were many cases which could not be relieved in other ways and there was real need among past members or their dependants.

Mr. C. F. W. Rendle, the Section's own Organising Secretary for the Benevolent Fund, endorsed Mr. Currier's remarks and made a special appeal for more contributors under deeds of covenant.

Educational Matters

Mr. H. R. Hems reported on the work of the Midland District Education Committee. Matters requiring attention had been mostly of a routine nature and the Committee had met only on one occasion during the year. Advice had been given to individual students, but the number seeking assistance had been relatively small. The list of examiners for the City and Guilds practical examination had been revised. The prompt assistance given by engineers and managers, and of the gentlemen who had offered to act as examiners, had been much appreciated.

Referring to the Institution of Gas Engineers Major Course Examinations there were seven colleges providing such courses within the area covered by the Midland Section. Altogether 45 candidates from within the Section boundaries succeeded in securing a pass. Full statistics were available only for external students, of whom 571 were successful; this was just a little higher than the average for the country. Results secured at the various colleges were very variable and were in one case so poor that the cause was being investigated.

Three nominees of the Committee attended the Education Conference held in November and the Committee continued to be represented on the Fuel Technology Committees of the East and West Midlands Advisory Councils for Technical, Commercial, and Art Education. No matters closely affecting the gas industry had arisen. Thanks were due to the lecturers in the various courses. At the last meeting of the Committee attention was drawn to the fact that the Midland Section of the Institution as at present constituted drew its membership from the areas of four area gas boards, but the membership of the Committee was all from the West Midlands. A second point mentioned at the last meeting was that while there were 13 successful candidates on the manufacture side in the latest Higher Grade Examinations there were only three on the supply side. It was a matter of some concern to the Committee, and he felt an effort should be made to attract a better type of student than apparently they had been able to attract so far. One other point was the fact that in the future probably far greater consideration would have to be given to the question of full time courses to meet the needs of the industry.

Induction of Chairman

Mr. Pearce then inducted his successor and in doing so he said Mr. Tran was a comparatively recent accession, having come to the Midlands in 1940. He started his gas industry career at Glasgow and following the customary pattern of a Scotsman he proceeded to wander further south. After a comparatively brief sojourn in Scotland—at Helensburgh and Coatbridge—he came south and plunged into Bath as Assistant Engineer. After a few years he went to Reading and ultimately he proceeded to Oxford, where, after four years, he was appointed Chief Engineer and General Manager of the Oxford Gas Company, subsequently to become on nationalisation Divisional General Manager, Northern Division, Southern Gas Board.

Mr. Tran, having been invested with the Presidential collar, returned thanks for his election and said his first duty was to present the President's—or Chairman's—Medal to Mr. Pearce in appreciation of his services during the past year. During the transitional period his ability, acumen, and energy had been of the greatest benefit to the Management Committee.

Mr. Pearce suitably replied and paid tribute to the work of Mr. J. Corrigan as Secretary, and of Mr. J. H. Wainwright as Treasurer.

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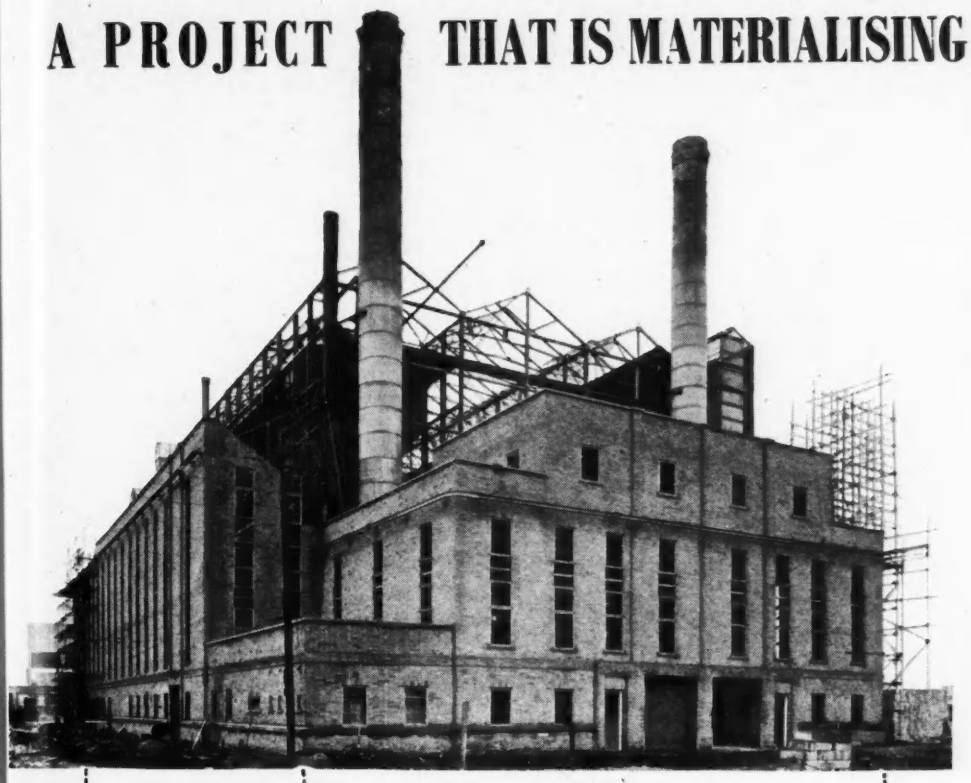

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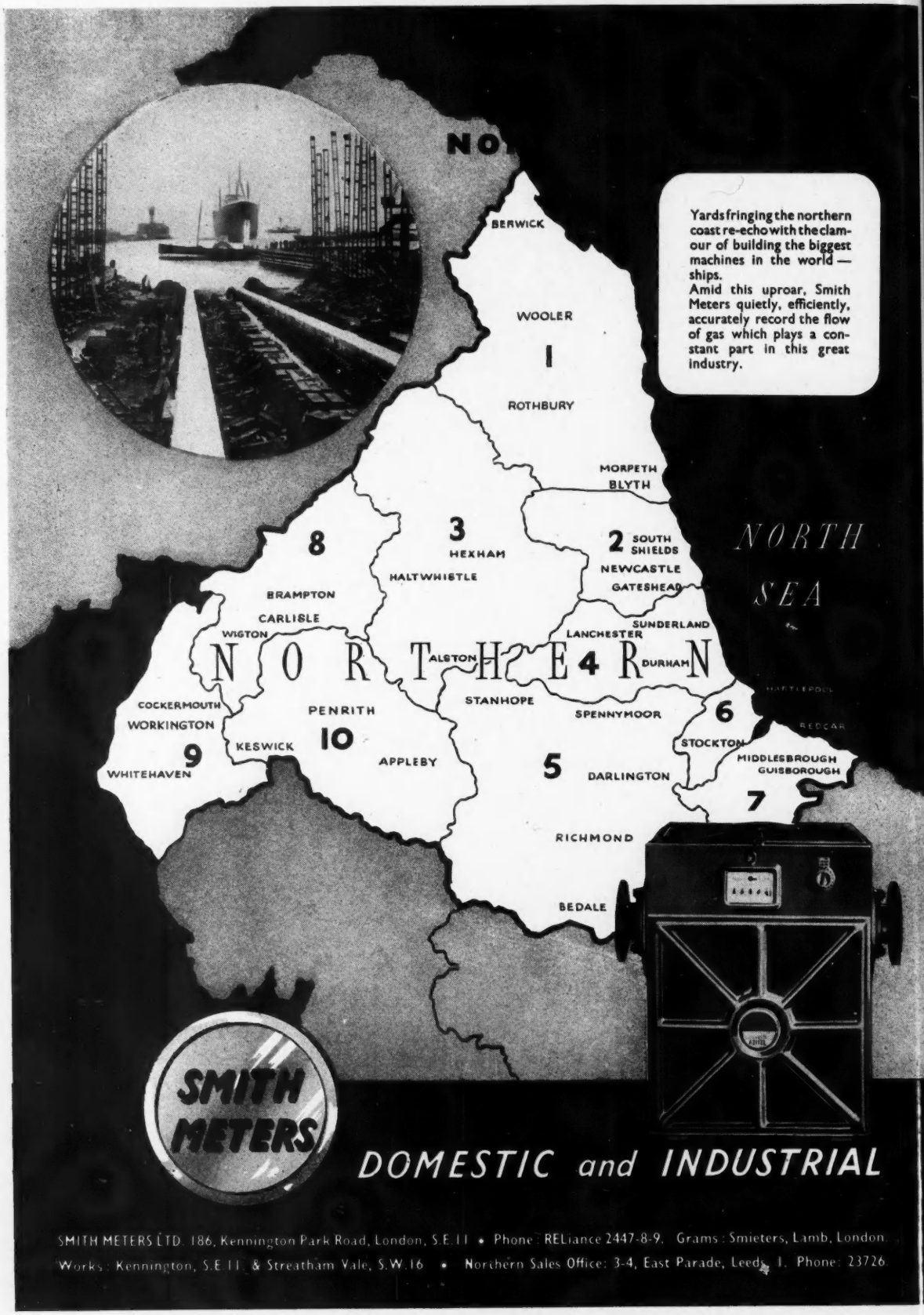
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Mr. **Tran** then delivered his Presidential Address, which we shall publish in a later issue.

Mr. J. E. Wakeford, Senior Vice-Chairman, proposed a vote of thanks for the address. He complimented Mr. Tran on the emphasis he had placed on the need to make people feel responsible for conducting affairs, to be able to act on the spot and to know that their decisions would be upheld. In his judgment that was vital from top to bottom, and the keynote was freedom and authority. He also appreciated his observations in regard to organisation, and he felt the simplicity of the set-up in the Southern area must appeal to them all. It seemed to have the attribute of ensuring that concensus of opinion on any matter throughout the area was brought right to Board level.

In his view there should be in each area some long term plan to enable the younger men and the newcomers to the industry to know what the final organisation was going to be. In the absence of such a plan the young man coming into the industry might see his goal but find his route closed. In the interests of all who served the industry he urged that they should know what the final organisation was going to be for each area so that each might make his way to his goal knowing that there was a route which he could take, and that there was no chance of that route being barred.

Mr. W. MacNaughton, Junior Vice-Chairman, in seconding the vote of thanks, described Mr. Tran's address as excellent, short, snappy, and clear. They would take it away and study with interest, and compare the set-up in the Southern Area with that in the other areas in which they served.

Summer Meeting Venue

The Chairman briefly responded and said he felt each area had something to learn from each other area. On behalf of the Southern Gas Board he extended an invitation to the members to visit Oxford for the summer meeting. There was to be a visit to the Oxford gasworks during the morning, luncheon at the Randolph Hotel as guests of the Board and an afternoon visit to the Morris works of the Nuffield organisation.

Mr. S. E. Whitehead, Deputy Chairman of the Southern Gas Board, added that the date of the summer meeting was to be June 15, and that on this occasion ladies would also be invited. He conveyed regrets for absence from Mr. O. R. Guard, Chairman of the Board, and offered congratulations to Mr. Tran on his appointment as Chairman of the Section.

The meeting was preceded by a luncheon at which Mr. K. L. Pearce presided.

Mr. Alexander Tran proposed the toast of the West Midlands Gas Board and in doing so extended a warm welcome to the principal guests. He referred particularly to Mr. F. M. Birks, President of the Institution of Gas Engineers and Deputy Chairman of the North Thames Gas Board; Dr. W. T. K. Braunholtz, Secretary of the Institution; Mr. H. F. H. Jones, Chairman of the East Midlands Gas Board; Mr. G. E. Currier, Junior Vice-President of the Institution and Deputy Chairman of the North Eastern Gas Board; Mr. S. E. Whitehead, Deputy Chairman of the Southern Gas Board; Mr. J. Powdrill, Chairman of the Wales and Monmouthshire Section of the Institution; Mr. Stanley Robinson, of Midland Tar Distillers, Ltd., and representatives of the Coke Oven Managers' Association and the Tame and Rea Drainage Board.

Turning to the subject of the toast, Mr. Tran said the recently published reports of the Gas Council and the area boards showed that the West Midlands Gas Board was No. 3 on the list, measured in terms of gas output, but it was the highest on the list for industrial consumption of any board in the country. It had astonished him to learn of the work achieved in the West Midlands since vesting day. The Board had approved or had in progress no fewer than 200 projects costing £13 mill. and was planning to increase its production capacity by 81 mill. cu.ft. per day to bring it up to 340 mill. cu.ft. per day. It would not be long before it was No. 1 on the list instead of No. 3. On behalf of the members of the Midland Section he thanked the Chairman and members of the Board for their hospitality.

Difficulties and Frustration

Mr. G. le B. Diamond, Chairman of the West Midlands Gas Board, said the Board appreciated the visit of gas engineers from so wide an area and he hoped the Midland Section would continue to flourish for many years to come. It was a good thing to have co-operation but it was still more important to have co-operation between the area boards. They had co-operation to a marked degree in the East Midlands Board; they had it with the Southern, and with the other boards surrounding them, though to some extent they were still separated from Wales by the geographical difficulties experienced in historical times.

The reports to which Mr. Tran had referred were the first factual representation and picture of the gas industry they had ever had. They described the immense amount of work that had been carried out by the area boards since vesting day. They in the West Midlands, in common with all the area boards gratefully acknowledged the cheerful and willing co-operation of the engineers and the accountants during the formative period.

News had been received that day that, after an immense battle lasting nearly 12 months the Ministry of Local Government and Planning had hauled down the flag and the West Midlands Gas Board was to be permitted to erect some gasholders at James Bridge, Walsall.

'Mr. Brotherick knows my feelings towards the civil service,' continued Mr. Diamond. 'They are excellent sentiments. I am not criticising the civil service, but the Town and Country Planning Act, which goes much further than the circumstances of the time warrants. The difficulties and frustration we have had through that Act have been greater than any I have yet experienced.'

Mr. F. M. Birks, President of the Institution of Gas Engineers, proposed the toast of the Midland Section. He said he had read with a great deal of interest that new book, *The Age of Elegance*, to which the Prime Minister referred in his recent broadcast. It was a book which clearly portrayed conditions in this country during the Napoleonic wars and it showed that our soldiers and sailors and statesmen could not have brought those wars to a successful conclusion had it not been for the great city of Birmingham. In those early days Britain relied a great deal on its premier manufacturing towns —of which Birmingham was the largest of its kind in the world—both for arms and equipment. The people of Birmingham toiled night and day, year after year, and it was during that time that William Murdoch, at the works of Boulton and Watt, was able to produce the first gasworks plant in the world. It was only a little later that steps were taken to form the old Chartered Gas Light and Coke Company and thus establish the first public gas service.

It was that particular link between Birmingham and London that had been responsible for the traditional friendship between their respective gas undertakings which still continued. Probably about half way between the period he had mentioned and the present day the Midland Association of Gas Engineers and Managers was formed. The records of the Association included the names of many eminent gas engineers, and Birmingham had provided the Institution with two of its Presidents, in the persons of Mr. George Pearson and Dr. Harold Hartley.

A Great Asset

Mr. Pearce, responding, said they felt that the Institution had never stood so high in the professional esteem of its members, and of the industry at large, as it did today. It was one of the great assets of the pre-vesting date era that had remained non-vested for which they should show their appreciation in every way. The fact that they had an independent association of engineers was not only in their own interests but in the interests of the gas industry.

The wisdom that was shown immediately prior to vesting date in the steps that were taken to change the district associations into district sections of the Institution would be appreciated more as the years passed. That closer association would undoubtedly lead to the greater strength of the industry as a whole. The attendances both at the annual meeting at Bournemouth and the autumn research meeting in London were evidence of greater interest in the Institution as a whole, and he felt the large attendance at that meeting illustrated the desire of gas engineers to meet together and exchange experiences and confidences. The fact that the Section was not confined to a single area but stretched over the territories of four area boards was a matter of some significance. The fact that they could provide a platform for discussion on technical and other matters of interest to the engineer and the industry was an extremely valuable contribution to the progress of the industry.

Research and the Juniors

By F. M. BIRKS, C.B.E., M.I.C.E., M.I.Mech.E., M.Inst.Gas E.,

Deputy Chairman of the North Thames Gas Board and President of the Institution of Gas Engineers.

The following address was given to the Manchester District Junior Association of Gas Engineers on March 17, the occasion of the Association's annual dinner, at which the author was guest of honour.

OF late much attention has been focused on that most important subject, research; and the gas industry itself has been most actively concerned in shaping a policy for its research organisations, and in considering the type of programme which would provide the greatest benefit to the industry and the public which it serves.

The emphasis which is given to research at the present time and the large scale establishments which have been set up to deal with the specific requirements of different industries may tend to give the junior the impression that research is an abstruse matter to be indulged in only by the theorist and specialist or, more colloquially, 'the backroom boy.'

Now I think that any such conception of this important subject may, apart from being quite incorrect, be actually dangerous, for the junior may thereby shirk his own responsibility of applying his mind to the quest of scientific discovery. Moreover, he might develop an intolerant and unrealistic approach to the results, recommendations, and lines of development put forward by the large research organisations, and so hinder his own development and that of the industry as a whole.

I feel, therefore, that it may be helpful to take stock of this matter and consider the subject of research from its widest angle and in particular to place it in correct perspective with the work of the junior engineer or technician in our industry, for only by the full co-operation and understanding between the pure research worker and the practical engineer can real progress be achieved.

Elementary Definition

When seeking a fresh approach to a familiar subject, I always find it helpful to refer back to its elementary definition, and here I find that my Oxford dictionary defines research as an endeavour to discover facts by scientific study or a course of critical investigation. These two definitions appear to me to epitomise the breadth and yet the simplicity of the subject, providing scope for the individual worker and also the wider investigations which call for the collaborative efforts of a full research team.

These simple definitions would also seem to dispel that prevalent but mistaken and unfortunate conception in which the researcher of today is regarded by his fellows as a man apart, enwrapped in a cloak of mystery and a 'mumbo jumbo' of scientific jargon and a person as unrealistic as the creations of Hans Anderson. The definitions make no suggestion that research will only yield its secrets to those who dwell in the clouds, but rather do they suggest that, fundamentally, research is little more than the applied common sense of a trained and disciplined mind and can be used just as effectively in the retort house, power room, or workshop, as in the laboratory or library.

The breadth of the definitions suggests to me that there is a need for different levels of research, according to the complexity of the problem to be solved—ranging from the simple questions relating to the more common physical and chemical laws which can be tackled by the individual to the complex problems associated with large scale development of, for example, an entirely new chemical engineering process which embraces a host of individual but related investigations and which calls for the co-ordinated efforts and considerable resources of a large scale research organisation. Such a conception as this brings us all into the field as potential researchers, each capable of contributing to the knowledge and progress of our industry at one or other of these levels in the technical structure based on scientific truths. I would also go so far as to say that the values of the work done at each level of research are not markedly different for they are complementary, one stone of truth being built upon another to achieve greater heights; and however much the eye may be attracted to the high peaks, their surety is entirely dependent upon the soundness of the lower supporting structure. Further I would say that the work which can be done at each level of the research structure cannot satisfactorily be transferred to another level. Local and peculiar problems can be satisfactorily solved only by local and detailed knowledge or experience.

When I visit some of the works in my Board's area, I am often encouraged to find that plant engineers, mechanical engineers, and chemists are engaged, apart from their routine duties of process control or maintenance, upon some pet problem or piece of research which has arisen from the close observance of their daily work. Now such work as this is of great importance, for if it were not for the objective approach of the technician or chemist, those peculiarities, discernible only in the day-to-day observations, would probably be lost. Further, the detailed experience of the man on the job gives him, and him only, the basic information which may be essential in solving the problem. So you see that we all have an essential part to play to complete the full pattern of research.

Ways and Means

I would now like to pass on to consider the ways and means we may adopt to achieve the best results. In the first place, the mind must be developed and trained to think logically and to direct its energies in such a way that results are achieved with a minimum of time and effort. Every university student in his training is encouraged, and in most cases required, to carry out some original research, so to develop those mental faculties and powers of observation which will produce the trained mind. A mind so equipped will, after some years of experience, be enabled to use sub-conscious or reflex energies to assist the mental processes and arrive at accurate conclusions immediately, without having to perform laborious, stage by stage conscious mental processes which would take much longer to complete. Such a combination of the trained and experienced mind explains why some people can so effectively 'sleep on' their problems and awake with the solution clearly defined.

Now we have already said that there is an opportunity for all juniors in the course of their daily work to apply their minds to routine observations and local problems in just the same way as the pure research worker, but they must have an objective outlook and 'eyes to see.' It is well for them to remember that small scale investigations can often be performed with the simplest of apparatus which give scope for ingenuity, but above all it should be appreciated that the brain is the most valuable piece of equipment for any research worker. The man on the plant has every opportunity for making observations and detecting peculiarities, for he is much more in the swim of things than the specialist. At the same time he must guard against the dangers of familiarity and bring

a critical mind to interpret those routine observations which, although apparently repeating themselves with regular monotony, may nevertheless be following some definite trend which only the most alert will detect. Sometimes when particular problems arise, it is desirable to bring in a specialist who can apply a fresh outlook on the facts; but in all such cases it is essential that there should be a close collaboration between the specialist and the man on the job.

In some cases it is desirable that there should be an actual interchange between the full-time research worker and the young process engineer. There is much to recommend the transfer of the young production engineer to full-time research, so as to give an aspect of reality to the team work involved and to research conceptions. Equally, it is desirable that young men should pass from research to production in order to bring new imaginations to traditional processes.

This principle of collaboration must be extended right down through the ranks and the help of foremen and plant operators enlisted whenever possible. Often it will be found that the operators develop a peculiar sensitivity in detecting the symptoms and behaviour of the plants they control. They may, however, be quite unaware of the latent potentialities and implications of the knowledge they possess, and by close collaboration the engineer should be able to interpret the observations and knowledge of these experienced but usually untrained minds. Such an attitude of active interest when displayed by the supervisory staff will also encourage the man in his job and establish that link of personal knowledge between the two, through which there should exist a channel for the man who possesses intellectual possibilities to be made known to managements and thereby advance as far as his capacity will take him.

Research by Men on the Job

During the many years that I have been associated with the gas industry I have had brought to my notice many cases of valuable applied research, which have been carried out essentially by the men on the job, and it may be of interest to recount a few of these here.

There was the case of a continuous vertical retort installation which developed the curious habit of consistently producing gas of lower calorific value during the night shifts. There was no obvious explanation for this, and the working conditions of the plant as shown by the temperature, rate of coke extraction, and degree of steaming, remained unchanged. On further reflection, however, it was suggested that the change in performance might be caused by some variation in coal quality, and as the calorific value of the gas followed a regular daily cycle, it seemed likely that the method of coaling the plant might have had some bearing on the problem.

In this case the overhead coal bunkers were filled once a day, and careful observation of the coal in the bunkers showed that when some eight hours had elapsed after refilling the level of the coal fell sufficiently for an inverted cone to form, which caused the larger pieces of coal to run down from the sides of the hopper and thus allow a preponderance of larger coal to flow into the retorts during the night hours. As no changes were made to the working conditions of the retorts, the larger coal was carbonised more rapidly and resulted in overcracking of the gas. Further, the percentage of steam decomposed in the retorts was increased owing to the larger coal, and the proportion of diluent blue water gas produced was thereby raised, causing the calorific value to fall. Various remedies suggested themselves such as the adoption of two shift coaling or the introduction of an egg-crate system of division plates which would prevent the coal from segregating as it flowed into the bunkers.

Then there was the case of the water gas plant engineer who had found that the gaseous thermal yields obtained from the oil supplied to the carburettor had changed in a manner different from that suggested by its evaluation number, while other conditions in the plant remained the same. After a careful examination of the properties of the oil, it was found that the boiling range of the new oil was markedly different from that of the old, thereby calling for different temperature conditions in the carburettor in order to achieve the optimum cracking conditions.

An interesting case relating to a large chain grate water tube boiler installation arose from the serious troubles caused by 'bird-nesting' and exterior fouling of the boiler tubes. At one time this became so serious that complete blockage of the boiler furnaces was occurring after only one week's steaming. When the records were carefully examined, it was revealed that this trouble was most serious at certain seasons of the year which were repeated from one year to another. Now the particular works was situated on the lower reaches of the Thames, and the purity of the water in the river varied according to the state of the tides and the wet and dry seasons of the year. At times of low river flow, saline water reached the works on the rising tides, but when the river was in flood the water was at all times quite fresh. Consequently, the sodium chloride content of the water varied from some 15 grains per gal. to nearly 2,000 grains per gal.

This river water was used for coke quenching on the works, and the boilers were fired with coke breeze. When the variations of sodium chloride content were plotted on a time basis against the number of steaming days obtained from the boilers, a close relationship was immediately apparent, for when the sodium chloride concentration was highest the boiler difficulties were the most serious. Further investigations revealed that some of the sodium chloride volatilised in the boiler furnaces and subsequently condensed on the boiler tubes, thereby acting as an effective cement for the fly ash, which caused rapid growth or encrustation on the boiler tubes. This information subsequently proved to be of value to the Boiler Availability Committee set up by the Electrical Industry to investigate similar problems associated with power station boilers. In the case of the gasworks boilers the remedy lay in the adoption of town water for coke quenching in place of the river water.

There are no doubt among my audience several members from the district, and I would like to say to them that practically every remark I have made concerning the opportunities for individual research applies just as fully to their work as to the plant technician, and I would like to support this with a case from the district.

Some years ago, a serious complaint was received from a hospital to the effect that when a certain gas fire was lit in the operating theatre an asphyxiating gas was given off which had serious effects upon the staff.

An examination of the equipment in the room showed three things, (a) the anaesthetic apparatus containing chloroform, (b) the sterilising apparatus heated by gas, and (c) the gas fire. A careful study of the ventilating characteristics of the room revealed the fact that when the gas fire was lit a strong updraught was produced which had the effect of drawing some chloroform over the gas-fired sterilising apparatus, and the chloroform which passed in close contact with the flame was decomposed to form hydrochloric acid; and it was the fumes from the latter gas which produced the serious and indeed dangerous condition in the operating theatre. The remedy was, of course, a simple one, and merely called for a re-arrangement of the apparatus in the room and proper control of the ventilating conditions.

Statistical Investigations

Another example of valuable research is to be found in its application to statistical investigations. Much useful work of this kind was carried out by the former Gas Light and Coke Company in examining meteorological data to determine average temperature conditions throughout the year and the degree to which individual days might deviate from the mean. Subsequently, a correlation was established between the average daily atmospheric temperature and the gas demand, and it is true to say that this work has proved to be of immense value to the Board in estimating the gas requirements from day to day and preparing schedules of plant required

to be available throughout the year to meet the load, and at the same time providing sufficient time for programmed repairs.

One of the most interesting examples of practical research was in its application to the understanding and solution of the gum problem. Following the introduction of gas dehydration plants at the various works of the former Gas Light and Coke Company, serious difficulties were encountered on the district due to the blockage of injectors, governors, and other small orifices with a gummy material. The matter was so urgent that it was necessary to enlist the help of the full research staff and the men on the works, and by their collaborative efforts a full explanation of the whole phenomenon was obtained and the remedies found.

Time will not permit me to tell you the whole story, but in essentials it was found from examination of the gum that it was nitrogenous in character, and subsequently it was revealed that the source of the nitrogen was an air inleakage to the retorts. Burning there in an atmosphere of gas, some nitric oxide was thereby formed. This nitric oxide subsequently combined with some of the complex organic constituents of the gas, such as butadiene and di-cyclo-pentadiene, forming the nitrogenous gum. One of the most difficult things to trace, however, was the fact that there was an unknown induction period in which the gum forming constituents were in contact but did not react, and this accounted for the delay which occurred in the actual formation and precipitation.

The chief reason for this phenomenon being associated with the introduction of gas drying was the fact that at many of the works and elsewhere it was necessary to use filming oil in the gasholder tanks, and consequently there was no water vapour in the gas space which hitherto had caused a film of moisture to form on the minute gum particles and load them sufficiently for precipitation to occur. More than one course of action suggested itself, but the most obvious one was to ensure that dehydration plants were placed on the outlet of the works holders and sufficient retention time allowed for precipitation to occur.

One of the most important morals of this story is the fact that one apparently simple change in the gas manufacturing process caused other unexpected consequences; and it is most important that any research worker should follow up any change he may make in a process with a critical examination of its possible influence in other directions.

The gum problem also demonstrated how effective the collaborative efforts of the works technician and the research team could be, and only by the combined effort of all concerned could success be assured.

A Chain Reaction

The need for research at the present day is becoming progressively more important, for as the horizon of scientific discovery broadens, even more possibilities present themselves, and all the whole process can be likened to a chain reaction. But still all the levels of research will continue, and as the pyramid grows in height so its base must be broadened and both small and large scale work must run side by side. The scientific tools of research today have become so numerous and complex that for the larger projects big organisations which can justify considerable resources become necessary. In general, it may be said that the higher the level of the work, the greater become the teams and equipment required to achieve the best results. With such developments, however, there is a need for close collaboration and interchange of information between different organisations if their work is to be most effective. The ever broadening horizon of possibilities emphasises the necessity of using our limited resources of brain power or intellect to the best possible advantage.

Those who are members of research organisations must be prepared to second some individuality in the interests of the team. It may be that the sections of the work assigned to some members are not particularly spectacular, but if the right spirit is engendered they will derive as much personal pride from the achievements of the team as a whole as from their own work.

In some respects the early inventors of the nineteenth century had some advantages, for they often saw more direct results from their labour as the steps or stages from the first inspiration to practical success were few and within the capacity of one man's brain; but today conditions have changed, and with these changes the mental outlook of the research worker must be adjusted.

The junior researcher must not be discouraged if he does not receive early recognition of his work, for to the real enthusiast the work in itself brings compensations and satisfaction and provides a stimulant to further endeavour, and he will be assured that sooner or later his merit will be recognised and he will be singled out according to his ability.

Managements today are fully alive to the demands of the situation, and every opportunity and encouragement will be given for individuals to develop ideas and, what it most important, to accept the responsibility for implementing the ideas and ensuring their success.

I indicated earlier that it is most important that the efforts put into research must be directed and used to the most effective ends. It is true that sometimes mass or what I might call 'steam hammer' research is called for, when every possible aspect of a problem is investigated to its end, whether that end be useful or not, and knowing full well that only a small proportion of the work is likely to be of real value. Such cases, however, are usually only confined to most urgent problems likely to have a material effect on the wellbeing or safety of the nation and in which manpower and expense are of little consequence compared with speed.

Conservation of Resources

In more normal research work the conservation of resources is more important, and it may be useful to consider what are the most logical steps when undertaking any particular piece of work. In the first place, care must be taken to gain a full appreciation of the problem. On the one hand, oversimplification must be avoided, but on the other hand, it must not be unduly elaborated. The next step is to collect all the facts which have any bearing on the problem and sort out the relevant from the irrelevant matter. In this sifting process the data must be carefully scrutinised, and if the reliability of any information appears doubtful it should be rejected forthwith.

At this stage the limitations of the existing information will become apparent, and the worker can define more precisely the additional data that will be required. From this, a programme of investigation can be formulated and carried out. When the results are available and have been carefully checked, they must again be reviewed in the light of all the facts to see whether they have given the data expected. It may occasionally be found that some repetition or modification of the experimental work is necessary at this stage, before any attempt should be made to draw conclusions, and there are many cases on record where the second attempt has produced the desired result. When finally the required conclusion is clear it should, if possible, be verified by an entirely new line of approach, for this will give full confidence to the work and will substantiate the remedial measures finally recommended, which may, of course, incur considerable expenditure.

In conclusion, I would like to consider the work of the Junior Associations in the overall pattern of research. I think that many of the papers presented at the meetings of the Junior Associations are in themselves examples of sound research, and the discussions which they promote are always animated and stimulating and give free play to the interchange of ideas, which is the very source of successful research. The activities of these Associations cover every facet of the work of our industry, and if one can judge from the records and transactions of the Junior Associations, I think there is little doubt that they have contributed a substantial share towards the technical progress and success of our industry over the last 50 years.

INTERMITTENT VERTICAL CHAMBERS at WESTON-SUPER-MARE

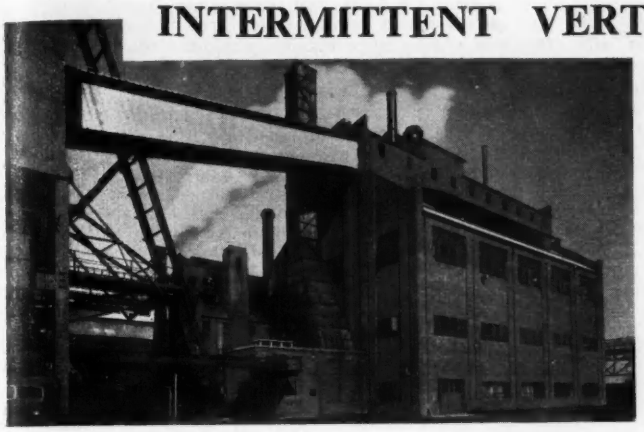

Photo by Woodall Duckham

By
W. J. BAKER
Sub-Divisional Manager, Weston-super-Mare

The following concise notes on installation, annual, and running costs of the 30 intermittent vertical chambers installed at Weston-super-Mare between the years 1937 and 1943 were presented to the South Western Section of the Institution of Gas Engineers at a meeting following an inspection of the works on March 14.

WOODALL-DUCKHAM intermittent vertical chambers were first installed at Weston-super-Mare in 1937. They were selected because of:—

(a) The large scope in the choice of coals they will carbonise.
(b) The proximity of Weston-super-Mare to the Somerset coalfields, which produce coal with a comparatively high swelling number; such coal being 26s. per ton delivered in 1937.
(c) The great flexibility of gas output obtained by the alteration of the charging cycle and adjustment of steaming rates.
(d) The comparatively low maintenance and re-setting costs.

It was appreciated that the disadvantages of intermittent chambers over continuous vertical retorts are the steam cloud resulting from the quenching of the discharged coke, and the gas cloud which is noticeable when the chambers are charged. The new plant has fume ducts, etc., which carry this gas to the atmosphere via a small stack.

The 1937 installation consisted of 15 chambers, but with foundations and coal and coke handling plant to suit 25 chambers, at a contract price of approximately £53,000. In 1939 ten additional chambers were erected on the previously installed foundations at an approximate cost of £20,000. In 1943 a further five chambers were added, for which foundations were necessary, but producers and coal bunkers were not extended; the cost was approximately £33,000.

Weston-super-Mare's gas production has increased as follows: 1937—571 mill. cu.ft.; 1942—711 mill. cu.ft. (25% increase during five years); 1947—926 mill. cu.ft. (30% increase during five years); 1951—will exceed 1,500 mill. cu.ft. (approximately 110% increase during nine years).

This increase of 110% since 1942 is partly due to bulk supplies to Wells, Glastonbury, Clevedon, Portishead, and Shepton Mallet, for which additional gas making was necessary.

These various bulk supply schemes (with the exception of Shepton Mallet), were approved by the Ministry of Fuel and Power in 1946-47, and Weston-super-Mare was authorised to install 18 intermittent vertical chambers, together with ancillary plant.

This new intermittent vertical chamber plant has a production capacity of 1.7 to 1.8 mill. cu.ft. per day, and concise details are as follows:—

(a) Foundations are in reinforced concrete carried on 134 'Franki' compressed heavy type piles, the maximum load on any pile being 80 tons.

(b) The beds are fully recuperative, with six chambers in each bed, the chambers being 21 ft. by 10 ft. with a minor axis of 12½ in. tapering to 8½ in. at the top, and having a static coal capacity of 3¾ tons. The refractory materials are Woodall-Duckham's 'Stourbridge.' The producers are not arranged as an external battery but are built to the full depth of the chambers, with one producer to each bed of six chambers.

(c) The coal handling plant consists of a Strachan & Henshaw tippler, 40 tons per hour band conveyor to breaker, with twin elevators to the top push plate conveyor. Bunkers have 48 hours' capacity, and are 'Gunite' lined.

(d) The waste heat boiler, capacity 3,700 lb. per hour, will cope with the waste gases from 18 chambers; there will be approximately 500 lb. of surplus steam not required for process use in the house.

Exhaust steam from the waste heat boiler turbine is fed to a boiler feed water heater and the exhaust from various chamber house pumps is fed to the producers as top steam.

(e) From the top buffer hopper at the skip hoist head, coke is delivered on to a twin vibrating 'Pegson Telsmith' screen, for de-breezing and the return of scalpings to producer fuel hopper or for chamber pads.

The coke handling and grading equipment is 25 tons per hour capacity, the skip hoist is by Strachan & Henshaw, and the grading screens are Corts, producing grades 0 to ½ in., ½ in. to 1¼ in., 1¼ in. to 2 in., 2 in. to 3 in. and over 3 in.

The bunkers have approximately 200 tons capacity, sloping bottoms and bunker chutes are lined with hard blue tiles, and the final 'large coke' bunker is fitted with a C.I. spiral feed for approximately two-thirds of its depth.

The coke bunker outlets are arranged with four travelling Pegson de-breezing screens, so that all coke is re-screened via the outlet chutes, smalls being returned to the top screening system.

Other features worthy of attention are: (a) Fume extraction plant and cyclone dust catchers; (b) cold air circulation at the top of the setting; (c) coal charging car; (d) vacuum cleaning plant; (e) spacious layout inside the house, providing excellent working conditions; and (f) access to windows at all levels.

The cost of the carbonising plant including 18 chambers, but with foundations for an additional 12 chambers, and with coal and coke handling plant to suit 30 chambers, will be approximately £240,000. The additional 12 chambers to complete the full complement of 30 chambers would cost approximately £80,000; consequently the present day cost for the complete plant of 30 chambers would be £320,000.

The results anticipated when carbonising the present coal allocation are as follows:—

Coal supplied.

Type	Per-centage	Analysis as supplied			
		H_2O	V.M.	Ash	Swelling No.
Norton Hill (Somerset) ...	13%	4.2%	31.6%	13.0%	8
New Rock (Somerset) ...	5%	3.3%	29.1%	15.3%	7½
Markham (East Midland) ...	27%	5.8%	34.9%	6.4%	6
Aberbaiden (S. Wales) ...	55%	5.1%	30.1%	9.2%	6
Average		5.1%	31.5%	9.3%	6.33

Results per ton of coal (12 hour cycle):—Gaseous yield, 14,650 cu.ft.—505 B.Th.U. = 74 therms.

Total coke and breeze (wet) ex chamber ... 15.0 cwt. (approx. 10% moisture)
Producer fuel (wet) ... ... 3.3 cwt. (16.5% of coal carbonised)
Breeze for sale ... ... 2.7 cwt.
Coke for sale ... ... 9.0 cwt.
Tar for sale ... ... 10.0 gal.

Net cost of coal: (a) Average price of coal, 69s. 6d. per ton; (b) revenue from coke (gross price less rail charges), 75s. 6d. per ton; (c) revenue from breeze, 20s. per ton; (d) revenue from tar, 3½d. per gal. The net cost of coal will be 4.82d. per therm made.

In order to consider the annual and running costs of the plant it is necessary to assume that the full complement of 30 chambers is installed. Such 30 chambers would carbonise an average of 210 tons of coal per day, equal to approximately 71,000 tons per annum, allowing for re-setting. Gas made per annum would be 5,250,000 therms.

Annual charges on a capital cost of £320,000: Interest at 3%; depreciation at 3½% average, making 6½% = £20,800 per annum.

Manpower: Shiftworkers, one top man, one bottom man, two producer men, one coke grading man, a total of five men per shift = 15 per day, plus relief men = 2½ per week, making 17½ per week at £360 per annum = £6,300.

Day workers: Two coal handling, one coke sales, two cleaners (average), one chamber patcher, a total of six men per week at £310 per annum = £1,860; total, £8,160; plus holidays (annual and bank holidays), £470; total cost of labour per annum, £8,630.

It is our experience that intermittent vertical chambers have a life of five to six years between re-sets, provided they are maintained at working heat. A re-set involves complete rebuilding between the main walls for the full depth of the chambers at a cost of approximately £6,000 per bed of six chambers, including producer repairs.

Bottom ironwork is replaced every second re-set at a cost of approximately £2,750 per six chambers. The coal charging car and the bottom coke 'bus both have a life of five to six years and cost £4,400 to replace. Therefore over a six year life, re-setting and replacement costs average approximately £7,000 per annum.

Other maintenance charges would be generally comparable with continuous vertical retort practice.

SUMMARY OF ANNUAL AND RUNNING COSTS OF 30 CHAMBERS

1.	Average coal carbonised per annum		=	71,000 tons.
	Average gas made		=	5,250,000 therms.
2.	Annual interest and depreciation charges,	£20,800 p.a.	=	0.95d./therm.
3.	Manpower, ...	£8,630 p.a.	=	0.40d./ ,,
4.	Re-setting, etc.	£7,000 p.a.	=	0.32d./ ,,
5.	Power. Coal and coke handling, pumps and lighting, etc. 5 k.w. per ton of coal = 355,000 k.w. 1.5d.,	£2,220 p.a.	=	0.10d./ ,,
6.	Net cost of coal		=	4.82d./ ,,
	Total annual cost per therm made ...		=	6.59d./ ,,

This figure of 6.59d. per therm made is not strictly the true cost of gas ex retort house, in that it does not include full maintenance costs, but it represents a figure easily comparable with that of other plants and conditions.

DISCUSSION

Mr. H. H. Brown, Chairman, before opening the discussion, welcomed three new members—R. Marsh (Exeter), R. Miller (Bath) and K. G. Bodiley (Weston-super-Mare)—and declared: 'We need a lot of new members, and we hope those who were members of the old Southern Association will do a little canvassing.' He pointed out that not least of the advantages of membership was the opportunity it gave to gas engineers to 'rub shoulders' with their colleagues from a very large area, facilitating a helpful interchange of ideas and information.

Turning to the paper, he congratulated Mr. Baker on the method he had adopted in submitting the very valuable and interesting information it contained. By setting forth the salient points, yet omitting nothing which was relevant, he had given them information which might well have been covered up by about 20 pages of script. There were two points arising from the paper on which Mr. Baker might be able to enlighten him; could the calorific value of the gas made in the plant, given in the paper as 505, be altered by altering the rate of steaming, and secondly, since it was appreciated that a disadvantage of intermittent chambers over continuous vertical retorts was the steam cloud arising from the quenching of the discharged coke, had there been any complaints from the neighbourhood? The latter point, it seemed to him, was a particularly important one in a seaside resort.

Mr. Baker replied that the amount of steam normally used for steaming was 6-8% of the weight of the coal carbonised, but if the cycle was increased from 12 hours to between 16 and 18 hours, the calorific value was reduced to 475. It was difficult, on a short cycle, to get below 500-510. He did not think the whole charge was effected by steam. In regard to steam cloud, he could not recollect ever having received any complaints.

Mr. Brown said he had studied the figures of ash resulting from the various types of coal supplied. In the old days no trouble had been experienced in securing a low ash average from the grades of coal then being used, and they had then steamed no more than 6-8%.

Mr. Baker said that in the old days the average figure of ash content was 10%, but under present day conditions it was necessary, if they were to keep the ash average at about that figure, to purchase other types of coal from areas outside the Somerset coalfields.

Mr. C. H. Chester, C.B.E. (Chairman of the South Western Gas Board) said he noticed the net cost of coal, per therm made, was given as 4.82d. Was there not found to be a variation in the cost per therm and, if so, what reasons could be advanced for variation in cost?

Mr. Baker replied that in these days much of their coke had to be 'exported' to areas outside the South Western division and this affected the amount which had to be paid in rail charges, thus affecting, in turn, the cost per therm. A short cycle was undoubtedly the most economical.

Dr. Arthur Marsden said that from laboratory tests on the type of coal which would be used at the Weston plant he would have anticipated 68 therms of straight coal gas, which, with 6-7% steaming would give 74 therms. This was the figure given by Mr. Baker under the heading of 'results anticipated,' but what he himself was interested in were the *actual* results. He would also be interested to hear whether Mr. Baker had any information as to the shatter index of the coke made.

Mr. Baker said the figures given under 'results anticipated' had since been justified by actual results now to hand, and these, he was pleased to say, were rather better than those given in the paper. In regard to the shatter index of the coke, there were no facilities at Weston for ascertaining this particular information.

Dr. Marsden observed that the producer fuel in the No. 1 retort house at Weston had been nearly 5 cwt.—now it was only 3.3 cwt., according to the paper. What were the reasons for this difference?

Mr. Baker replied that No. 1 retort house had been built as a non-recuperative house, and at that time the producer

(Concluded on page 123.)

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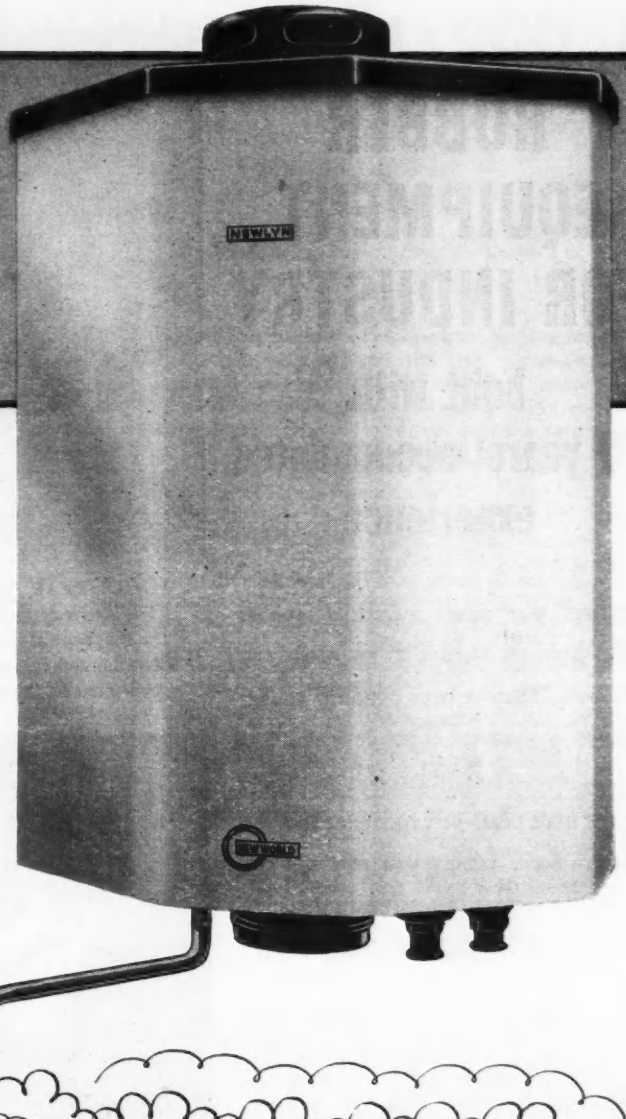

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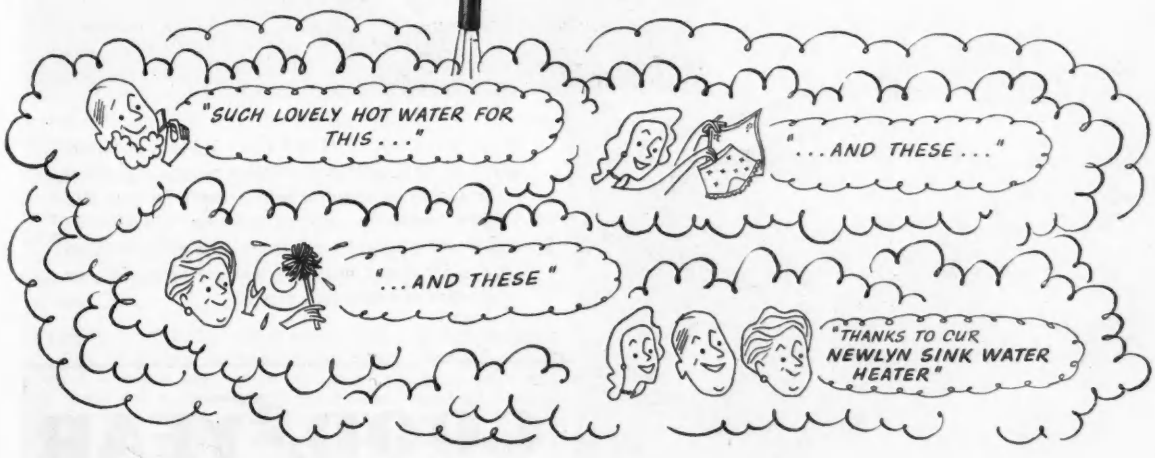

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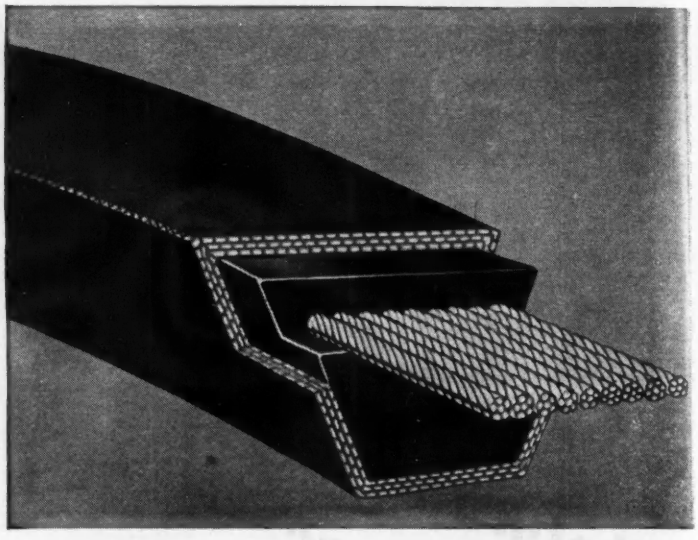

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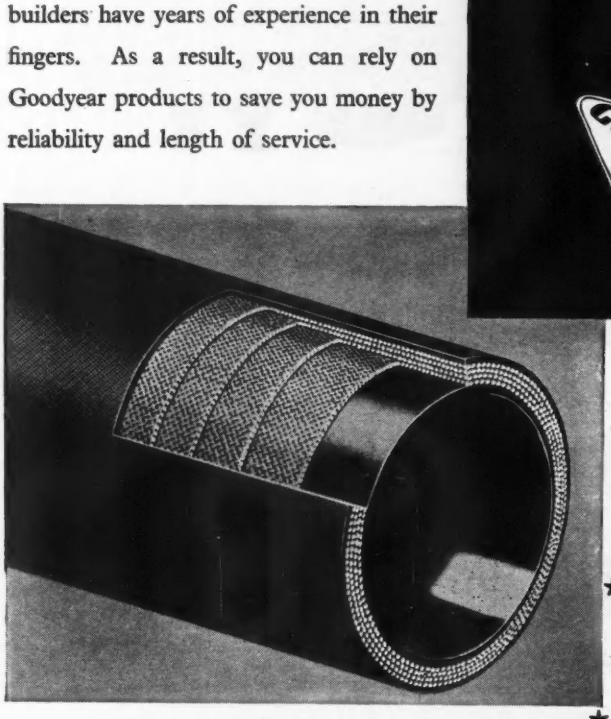

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REACTIVATION OF BONE CHARCOAL

By

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This paper at a meeting of the North Western Branch of the Institution of Chemical Engineers at Radiant House, Bold Street, describes the process of sugar refining and the use of bone charcoal for decolorisation of sugar liquors. The conventional methods for reactivation of bone charcoal in indirect fired pipe kilns are reviewed, and the need for improvement in this process is stressed. Laboratory scale experiments on the reactivation of bone charcoal by direct contact with the hot products of combustion of town gas are described, and the design of a multiple hearth gas-fired kiln utilising this direct contact principle is dealt with.

RAW sugar, the raw material of the sugar refiner, consists of a mixture of relatively pure crystals of sucrose, covered with a film of the mother liquor from which the crystals were separated, together with small quantities of insoluble impurities such as cane fibre, colloidal matter, sand, etc. The film of mother liquor contains the soluble impurities, organic and inorganic, which, together with the insoluble impurities, the refiner aims to remove to produce sucrose of at least 99.95% purity.

Briefly the processes involved are:—

Affination: in which the raw sugar is mixed with a saturated sugar solution to soften the adhering film, this syrup being spun off in centrifugal machines, and the remaining sugar washed with a spray of water. This washing process dissolves a considerable amount of sugar, which is recovered by boiling the washings to crystallisation in vacuum pans, and separating the crystals from the mother liquor in centrifugal machines. Usually three boilings are required before the final syrup spun off the machine becomes molasses—*i.e.*, a syrup from which no further sugar can be obtained by crystallisation. The sugars recovered are known as remelt sugars.

Filtration: in which the washed sugar from the affination process, and the remelt sugars, are dissolved in water and filtered to remove insoluble impurities.

Decolorisation: in which the clear filtered liquor, brown in colour, is allowed to percolate through beds of granular bone charcoal to remove most of the colour and some of the other impurities.

Crystallisation: in which the decolorised liquor is boiled to crystallation in vacuum pans the crystals being separated and washed in centrifugal machines. By a system of re-charring and re-crystallising the successive syrups spun from the centrifugal machines, the bulk of the sucrose content of the incoming raw sugar is eventually obtained as pure sucrose in crystal form.

During the process the refiner must avoid high temperatures, which tend to destroy sucrose; acidity, which causes inversion of sucrose to invert sugar; high alkalinity at high temperatures, which tends to destroy invert sugar; and bacterial action, which ferments sucrose. All these factors lead to loss of sugar, and it is the refiner's constant endeavour to maintain this loss as low as possible.

It is not within the scope of this paper to discuss the merits of bone charcoal as a sugar-refining agent, so it will suffice to say that, as yet, no other substance has been found to equal the performance of bone charcoal, or as it is commonly known, char.

Char was first prepared by Figuer in 1810, who used it to decolorise vinegar. Limcuzier applied it to grape sugar purification, and Derosne applied the material in the infant beet sugar industry. The first British patent was taken out by Martineau and Martineau in 1815, who used it for sugar refining as a powder which was placed in the liquid to be decolorised and separated by filtration after the process was completed.

Dumont in 1828 prepared a granular char, through which he passed the liquid to be treated, and Derosne took out a British patent in 1830 for the use of the granular material.

The firm of Fairrie Bros., later Fairrie & Co., Ltd., were the first in England to use granular char in filters on a large scale.

Char is manufactured from animal bones which are degreased, crushed, and destructively distilled in closed retorts, following which it is sieved into various grists.

The adsorption effects of char are due primarily to its porous structure, which presents to the liquor a very large surface, mainly of calcium phosphate, covered with activated carbon. As well as removing colour from sugar solutions, it has the property of adsorbing a considerable proportion of the mineral salts, and this is of great importance to the refiner.

The char is packed into cisterns 8 to 10 ft. diameter by 16 to 20 ft. high, through which the brown liquor is allowed to flow. After running for a time, the colour of the effluent liquor deteriorates to a point when it is no longer suitable for producing a high quality white sugar. The inlet liquor valve is then shut, and water is run into the cistern until all recoverable sugar has been washed from the char. The sweet water so obtained is returned to the process for reclamation of its sugar content. The washing is continued with the effluent running to sewer, as it is found that much of the inorganic matter adsorbed by the char can be washed out and eliminated in this manner. When this washing is completed the char is drained, emptied from the cistern, and sent to the kilns for reactivation.

Reactivation is effected by heating the char in closed retorts to a temperature of 850°F. to 950°F. The operation, usually known as burning (a misnomer, since uncontrolled combustion is serious), distils off some of the adsorbed organic impurities and carbonises the remainder. Continued use and reactivation leads to a deteriation in the adsorptive capacity of the char, one of the chief reasons for this being that carbonised impurities are deposited in the pores, so causing a decrease in the effective surface area of the char particles. This leads to an increase in the bulk density of the char, and in most refineries the heaviest char particles are discarded by a specific gravity separator. This is of no further use for

decolorisation, and is known as spent char. The carbon content of the char also increases due to this deposition of carbon, which being inactive is of no value as a decolorant. Increase in carbon content of char is, therefore, generally an indication of a lowered char quality.

During the handling processes a certain amount of attrition takes place, and, since the presence of dust (through 60 mesh) hinders the flow of liquor through the cisterns, this must be continuously removed.

This continual removal of spent char and dust has to be compensated by a regular input of new char, and the life of the char is very much dependent on these two factors. Any intended change of process must, therefore, take into account the amount of attrition expected, and the effect on the rate of deterioration of the char.

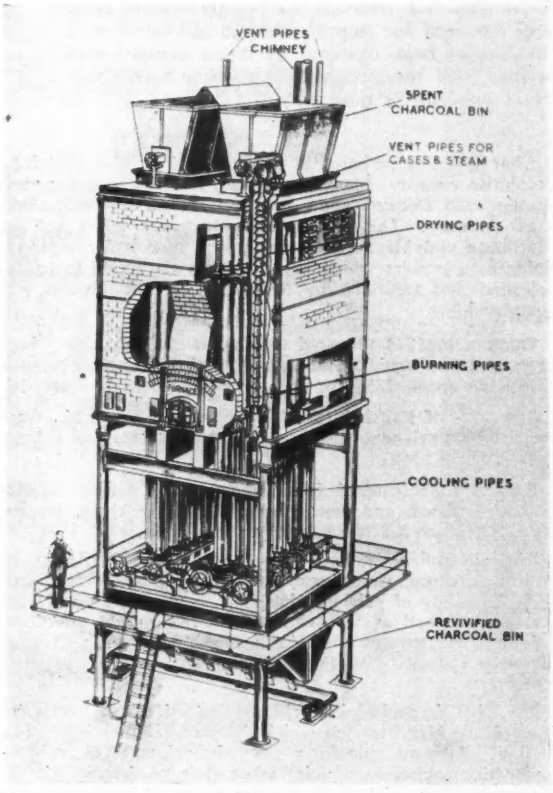

Fig. 1.—Buchanan Revivifying Kiln for Spent Charcoal. Nominal output 1 ton per hour (dry).

Concerning deposition of inactive carbon in the pores, it has long been recognised that controlled decarbonisation could prevent this deposition, and methods of reactivation which can effect this must be given very careful consideration.

The efficiency of the char-burning process is usually judged by two or three simple tests. The pH of an aqueous extract of the char should be 8.5 to 9.0. A lower pH indicates that the char has been underburnt, and in subsequent liquor cycles the liquor will become acid and inversion of sucrose will occur. The quantity of organic matter remaining in the burnt char is judged by boiling a weighed amount of char with a given volume of a standard caustic soda solution. If the char is well burnt a colourless solution is obtained; if not so well burnt a yellowish colour is obtained, the amount of colour being an indication of the quality of the burning. Well-burnt char should also be practically sterile; under-burnt chars will contain types of bacteria which are particularly troublesome to the refiner. If the reactivation temperature is too high, calcium sulphide is formed from calcium sulphate present in the char, by virtue of some of the carbon acting as a reducing agent. Such char is known to be 'over-burnt,' and is detected by adding lead acetate to the caustic soda extract, when a black precipitate shows the presence of the sulphide.

Char Reactivation Kilns

The reactivation of char is carried out in specially-designed kilns, and as the char for burning contains about 20% water, the installations usually consist of equipment for drying, kilning and cooling the char. It is not intended in this paper to discuss driers and coolers, but it can be said that in both these directions much remains to be done to improve efficiency.

The reactivation of bone char by heating in the absence of air is contained in a patent of de Cavaillon dated 1817, and the earliest description of a pipe kiln is in Parker's patent of 1839. This kiln contained all the elements of the present-day pipe kilns, although many patents dealing with details were taken out in succeeding years. By 1880-90 the development of char kilns had reached a conventional design and no striking improvements have been made from that time until recently.

At present three principal types of kiln are in use. They may be termed the U.S.A. type, the Scotch type, and the Buchanan type.

In all these types the char is heated indirectly, and the installations consist of a furnace on each side of which are rows of vertical retort pipes through which the char passes. The combustion chamber runs horizontally through the length of the kiln, in some cases being fired from both ends, but more generally from the front only. The U.S.A. kilns have from 72 to 120 oval cross-section pipes 3 in. × 9 in. to 12 in., and from 8 to 10 ft. long. These are usually arranged in double or triple rows on each side of the combustion chamber. The Scotch kilns have 64 vertical oval pipes arranged 32 on each side of the furnace. In the U.S.A. and Scotch type kilns the tops of the pipes are open to a box which receives the char from the drying section, and the bottom portion of the pipes act as a cooling section by natural air convection. The char is withdrawn from the bottom of each pipe by an intermittent draw device, the char throughput being governed by the speed of this device.

The Buchanan kiln (Fig. 1) has a double row of retorts on each side of the furnace, each kiln having 22 retorts. Each retort is of a combination type having drying, burning and cooling sections. The pipe is about 12 in. in diameter, and is fitted with a louvred ventilation pipe which extends through the drying and burning sections. The char passes down between the inner surface of the pipe and outer surface of the ventilation pipe, being turned over and the layer 'thinned' out as it passes over the louvres. Each retort pipe branches out into a bunch of seven oval sheet metal cooling pipes which end in the discharge boxes, these consisting of a pair of fixed hoppers which fill four small rotating measuring boxes. Each retort assembly is slowly rotated, and the char throughput is varied by altering the speed of rotation.

In the retort-type kilns the hot gases from the grate are drawn over the pipes, out through ports at the bottom of the kiln, up vertical or inclined flues to the drying section and then to the chimney stack. The heating of the char is done by conduction of heat through the walls of the pipes. Because of this, temperatures substantially higher than that required in the char have to be maintained in the kilns. Until recent years cast iron pipes were used, and the cost of replacing burnt-out pipes was fairly considerable. In the U.S.A. an improvement has been made by utilising three thin wall tubes made of heat-resisting steel containing about 18% chromium. These tubes fit into a header of the same size as the older cast iron oval pipe header, and are, in general, so advantageous that the cast iron retort will probably soon be eliminated.

Many patents have been taken out for rotating kilns, but none has ever been used on a large scale. E. W. Rice[1]

developed such a kiln which has been used in a small refinery. Essentially the kiln consists of a long rotating drum with its axis inclined slightly to the horizontal. The drum is heated by an oil burner at one end, and is arranged so that some of the products of combustion can be recycled through the drum so that the quantity of excess air can be regulated. Rice reported that temperatures of 600°F. to 700° F. for 10 to 30 min. gave satisfactory reactivation.

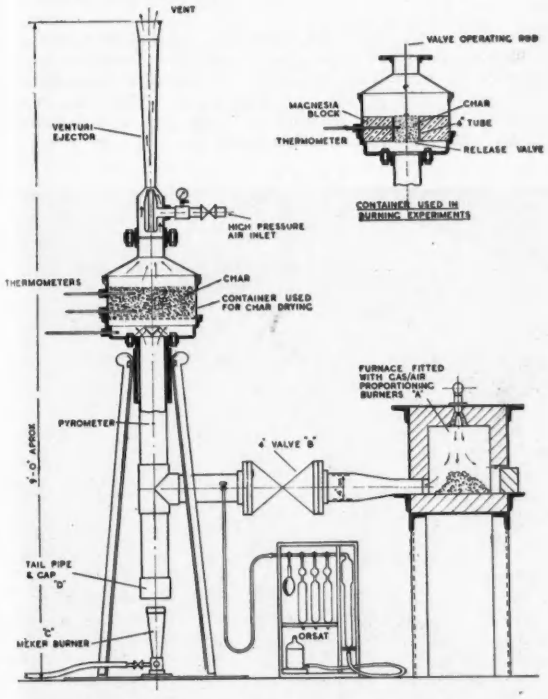

Fig. 2.—Experimental Char Drying and Burning Plant.

In the retort-type kiln the walls of the pipes have to be heated to a much higher temperature than is needed for correct char burning, and as char is a bad conductor of heat there is always a tendency for char near the pipe wall to be hotter than that in the centre of the pipe. For this reason it is possible to obtain samples of burnt char which give positive results to both the under-burnt and over-burnt tests.

With the present kiln designs it is difficult to maintain all the pipes at the same temperature, and this again leads to lack of uniformity in the quality of burning. Some refineries try to correct this by running char through the outer pipes at a slower rate than through the inner ones.

The burning is done out of contact with air, and there is a gradual increase in carbon content of the char with a consequent decrease in quality. Some refineries do not experience this increase, due presumably to air leaking into the tubes. Attempts have been made to control the carbon content by admitting air into the tubes, but results are not generally satisfactory, due to the lack of uniform admixture of the char and air. At least one refinery in America, however, claims to be obtaining good results by this method.

From the thermal efficiency point of view retort kilns are far from ideal. Comparing the heat needed to dry and burn the char, with the heat in the fuel used, the kilns are about 50% to 55% efficient. By careful design and utilisation of waste heat it should be possible to improve on these figures.

Other disadvantages of the retort-type kilns are: throughput per kiln is low (1 to 1½ tons per hour) and space required is large, maintenance costs are fairly high, efficiency of burning depends largely on quality of coal, and a long time is required for bringing the kiln up from cold to working temperature.

Oliver Lyle states in his book,[2] 'The char kiln is the most inefficient tool we use in sugar refining, and improvement is long overdue.'

One of the reasons for the lack of improvement is probably that the char house of a sugar refinery is only replaced at long intervals, since it entails a large capital expenditure. With the present trend of increasing costs for fuel, labour and equipment, it is essential that improvements in operating efficiency be introduced. For these reasons much research work is at present being directed to the reactivation of char, and in America the National Bureau of Standards has a bone char project headed by Dr. Dietz, which is investigating all aspects of char utilisation.

Tate and Lyle, Ltd., are tackling the reactivation of char along the following lines:

1. Improvement of the stationary pipe retort kiln with maximum recovery of waste heat.

2. Application of the fluidised bed technique.

3. Application of direct contact burning in a multiple hearth-type furnace (the Nichols-Herreshoff Kiln).

The remainder of this paper is devoted to the developments under the third heading.

Laboratory Experiments

Early in 1945 a design for an improved kiln was being considered by the Liverpool refinery, and town gas, among other fuels, was under review as a heating medium. The departure from traditional design of this kiln lay in a proposal to admit a mixture of waste gases from the combustion chamber, mixed with air, into the upper or drying section of the kiln by means of louvres in the tubes. Doubts were expressed as to whether this would have a deleterious

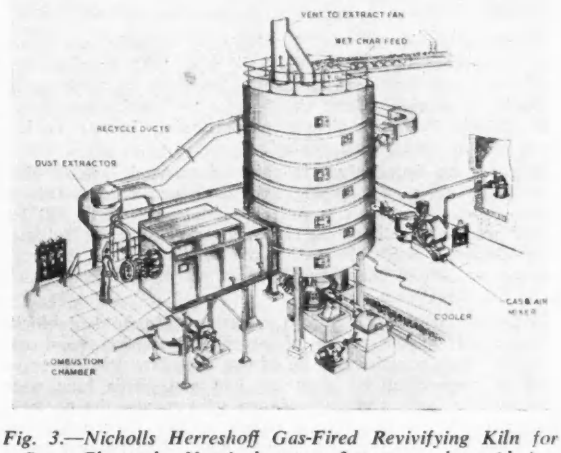

Fig. 3.—Nicholls Herreshoff Gas-Fired Revivifying Kiln for Spent Charcoal. Nominal output 3 tons per hour (dry).

effect upon the char by the lowering of pH value, and adsorption of CO_2 and sulphur compounds. In the absence of factual knowledge, the Liverpool gas undertaking offered to carry out in their industrial laboratory a series of experiments on the drying of char in direct contact with a mixture of products of combustion of town gas and air.

After careful consideration it was decided that, should direct contact drying prove successful, direct contact burning might also be possible, due to the close degree of control which can be effected over mixtures of town gas and air, and the products thereof. If this could be performed the advantages would be:—

(1) The overall efficiency of the char kiln could be increased.

(2) A smaller combustion chamber could be used.

(3) Increased rate of heat transfer to char should give greater output per kiln.

(4) Smaller plant space would be required.

(5) A fuel of higher price—*i.e.*, town gas—might be justified.

(6) Strict control of kiln atmosphere would allow of controlled decarbonisation of char, and so eliminate the necessity for rejecting char as a spent material.

The goal was sufficiently attractive to disregard warnings that, as far as was known to us at the time, previous attempts at direct contact processing had been unsuccessful.

Direct Contact Drying

An experimental unit was built in the industrial laboratory of the Liverpool gas undertaking, and this plant, with modifications, was used throughout the laboratory scale experiments. Direct contact drying at 212°F. provided no difficulties, but the plant was also required to perform 'burning' experiments when products of combustion at upwards of 850°F. were to be handled. In the absence of a hot gas fan, it was decided to operate the plant under suction by means of a venturi ejector, using an available high-pressure air line of up to 30 lb./sq. in.

Fig. 2 shows the arrangement of plant.

For the drying experiments valve 'B' was closed and tail pipe 'B' opened, a large Meker burner being placed beneath. With the high-pressure air to the ejector turned on a suction was created, and a mixture of products of combustion and air was drawn up the vertical pipe and through a container holding a small quantity of wet char on a fine wire gauze. The suction and gas rate were so adjusted as to maintain a temperature of approximately 212°F. under and in the char.

A number of tests were performed in which char was satisfactorily dried. The pH values of these dried chars were satisfactory, and there was no indication of sulphur or CO_2 adsorption.

Burning Tests

Referring again to Fig. 2, 'burning' experiments were then conducted by closing the tail pipe 'D,' opening the valve 'B,' and thus drawing neutral products of combustion through the container from the furnace 'A,' which was fitted with British Furnaces air/gas proportioning burner equipment with a micrometer control.

It was soon found that, in spite of external lagging, the heat losses from the piping and container necessitated a higher degree of suction in order to attain 850°F. to 950°F. in the products reaching the char and to provide the volume of products required. Increasing the suction by the required amount resulted in char being thrown out of the ejector outlet in the air stream.

The container was therefore re-designed to hold a block of magnesia, in the centre of which was fixed a piece of 4-in. steel tube containing 1 lb. of dry char (pre-dried in products of combustion of town gas and air). This tube was fitted with a base and cap of fine wire gauze, the former being arranged in two hinged halves so that char could be discharged through the vertical tail pipe. Experiments were conducted utilising various types of char, different burning temperatures, methods of cooling and discharge.

The results from a long series of experiments showed little, if any, difference from char processed in the existing coal-fired indirect pipe kilns of the Buchanan and Scotch types, and the presence of any sulphur compounds in the products of combustion of town gas appeared to have no effect upon the pH value. Conclusions reached were:—

(1) It is possible to burn char by direct contact, and, in subsequent liquor cycles, to obtain results comparable with those produced by existing methods.

(2) Under appropriate time and temperature conditions it is possible to burn any char, irrespective of its previous use, and make it suitable for liquor cycles.

(3) Burned char should be cooled to at least 280°F. in the products of combustion before being discharged to atmosphere.

During the period September, 1945, in which the burning experiments were being conducted, an executive from the Liverpool refinery was visiting refineries in the U.S.A. From this source a report was received that one refinery, that of Refined Syrups and Sugars, Inc., of Yonkers, was using a full-scale kiln utilising the direct contact method and burning fuel oil.

Subsequent correspondence disclosed that the kiln was of the Nichols-Herreshoff type (Fig. 3) and that, following early difficulties of operation, the unit was working successfully. The chief chemist of the firm stated that, while oil firing had ultimately proved satisfactory, town gas would almost certainly offer still further advantages.

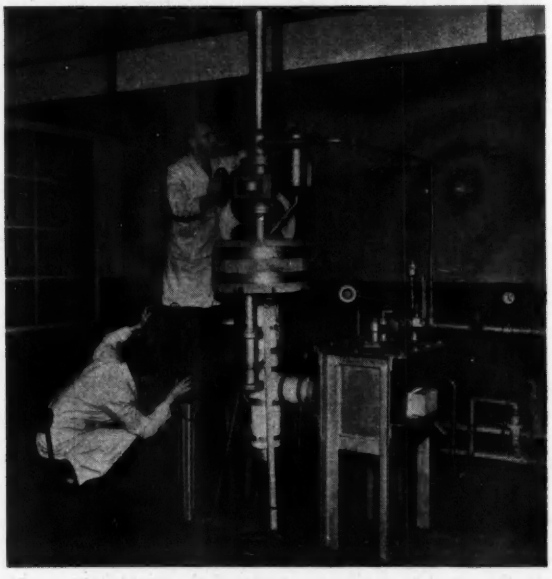

Fig. 4.

This type of kiln is manufactured under licence in this country by Huntington, Heberlein & Co., of London.

This information provided a welcome confirmation of the laboratory results, and it was decided to proceed with a series of decarbonisation experiments, and also with the design of a full-size gas-fired Herreshoff kiln.

A laboratory investigation was therefore performed in a modified version of the original experimental plant, the existing char container being replaced by a container modelled on the Herreshoff kiln principle. This was arranged to have three shelves, above which rotated bladed rabble arms, and the container was fitted with a hopper and valve, by means of which a reasonably continuous rate of feed could be maintained by hand adjustment. The treated char fell from the unit into two sealed vertical pipes, from which it was extracted at the conclusion of each run.

Fig. 4 shows the plant in operation.

The Nichols-Herreshoff Kiln

This type of kiln (illustrated in Fig. 5) consists of a number of firebrick hearths, above each of which two rabble arms rotate. The blades are set so that the char (or other material) gradually moves towards the centre of one hearth, falls through the central hole on to the next hearth, and is then moved outwards to fall again through holes near the periphery of the next hearth, and so on through the plant. The central driving spindle rotates at a speed of 1 to 3 r.p.m. and is

air cooled, air being drawn through by an exhaust fan, which also extracts water vapour and waste gases from the top hearth of the kiln.

In the Yonkers (U.S.A.) oil-fired kiln, which has nine hearths, drying is done in the upper hearths, and the bottom two were originally intended as cooling hearths. The burning hearths are situated two hearths up from the base, and the temperature of the gases therein is 950°F. to 1,100°F. A recirculation system is employed whereby cooler products of combustion from higher up the kiln are mixed in the combustion chamber with new entering products in order to reduce the combustion chamber temperature and that of the burning hearths. In the oil-fired kiln difficulties had been encountered with the burning out of combustion chambers, due to insufficient waste gases being recirculated, and it was apparent from the data available that alterations had been made to the fan and recycling system. At the outlet from the kiln the char falls through a tubular cooler, water being circulated round the outside of the char discharge tubes. An automatic discharge gate at the base of the cooler keeps the tubes full of char at all times, and at exit from the cooler, where it discharges on to a conveyor belt, the char is at a temperature of 280°F.

Design of Gas-Fired Kiln

It was decided to proceed with the design of a pilot gas-fired Herreshoff kiln of three tons per hour nominal output. Later operating experience shows that this was a low estimate.

Fig. 5.—Gas-Fired Herreshoff Kiln in course of construction.

It was obvious that considerable improvement in design could be made over the oil-fired unit by accurately assessing the requirements of the recycling system, by careful design of the combustion chamber, and by increasing the insulation at various points. The use of a gas/air mixing machine provides accurate control of atmosphere at any required condition. The data and calculated heat balance for the gas-fired kiln are given below.

Estimated Heat Requirements

Seven hearth kiln (two bottom cooling hearths omitted).

Output—3 tons of char dried and burnt per hour.

Hearths 5, 4 and 3 to be provided with recycle outlets, hearths 4 and 3 being normally used.

Estimated hearth temperatures: (7) 1,110°F., (6) 950°F., (5) 830°F., (4) 550°F., (3) 500°F., (2) 420°F., (1) 330°F.

Wet char contains 20% moisture.

Wet char enters kiln (after washing with water at 200°F.) at 160°F.

Heat of wetting to be restored to char = 20 B.Th.U. per lb.
Specific heat of dry char = 0.23.

Calculated Thermal Balance for Gas-fired Kiln

	B.Th.U. per hr.
Sensible heat in 6,720 lb. char to 950° F. ...	1,221,000
Heat of wetting in 6,720 lb. char	134,000
Sensible heat in 1,680 lb. water	87,500
Latent heat of evaporation in 1,680 lb. water	1,630,000
Sensible heat in 45,024 cu. ft. water vapour ...	117,500
Sensible heat in products of combustion at 330° F.	220,000
Latent heat in products of combustion at 330° F.	400,000
Recycle duct radiation loss	49,000
Burner endplate cooling water	15,000
Combustion chamber and ports radiation losses	28,000
Kiln body radiation losses	98,000
Spindle cooling air loss	120,000
Unaccounted for losses, say	41,000
Total ...	4,161,000
Credit 83·5 B.Th.U. per lb. of char output* = 6·720 × 83·5...	561,000
Heat input to kiln	3,600,000

Proposed gas rate = 8000 cu. ft. per hr. of 450 B.Th.U. gas.

* Heat is evolved by exothermic reactions during the burning process. The Holmes-Kemp gas/air carburettor was, however, arranged to be capable of dealing with up to 12,000 cu. ft. per hour, and at a later stage of actual operation the burner capacity was also increased to this figure.

Erection of the kiln commenced in October, 1947, and the plant was completed in 1948. The main body of the kiln is similar to the oil-fired unit, except that it was decided that the two lowest hearths could be dispensed with, making the gas-fired unit one of seven hearths.

The kiln is 12 ft. in internal diameter, and is approximately 28 ft. overall height. The combustion chamber measures 5 ft. × 6 ft. × 4 ft. 6 in. high to the spring of the arch, and supplies eight port openings to the two bottom hearths, each port measuring 12 in. × 6 in.

The combustion chamber could not be built direct on to the kiln owing to the maker's insistence on heavy steel retaining bands being carried right round the cylindrical kiln casing.

The gas-fired kiln and combustion chamber have been provided with two courses of insulation brick to reduce heat losses. The recycle fan and ducting are also insulated with 2½ in. of best quality lagging, while the method of entry of the recycled products of combustion into the combustion chamber is effected by discharge through eight 6-in. diameter nozzles positioned radially around the burner mounting plate.

The eight main burners are mounted on a 1 ft. 10 in. diameter in a circular water-cooler burner plate. Each burner is capable of passing 1,500 cu.ft. of gas per hour.

The supply to the burner is provided by an air/gas mixing carburettor manufactured by W. C. Holmes & Co., Ltd., who supplied all combustion and recycling equipment.

Gas and air are mixed in the correct proportions in this carburettor, and the mixture is then passed forward by the compressor at a pressure of approximately 49 in. W.G. to the burners. Fig. 6 shows the lay-out of carburettor and compressor. Gas from the meter flows through the pipe and valve (A) to the inlet dead weight regulator (B), which is set to discharge at approximately 1½-in. W.G. pressure. Air is drawn through an air filter, entering at check valve (C). The air and gas under suction from the turbo-compressor (D) are drawn together through the proportioning slide valve located under the cover (E) to the turbo-compressor (F). Here the gas and air are thoroughly mixed and boosted to a positive pressure. The operating diaphragm (J) of the proportioning mechanism rises or falls in accordance with the demand for air-gas mixture, and by so doing, opens or closes a slide valve so that the volume of mixture always in predetermined ratio, meets the demand. The ratio of air to gas is manually set by a micrometer setting wheel, and is normally locked in the required position. As the supply pipe from the compressor outlet carries a highly explosive mixture, protection against backfire is provided by the fitting of a 'fire check' in the mixture supply immediately preceding each burner

orifice. Each fire check consists of a metal honeycomb flame trap backed by a spring closing valve, normally retained in the open position by a link held by a blob of low melting-point solder. Should the flame flash back to the flame trap, it is held there sufficiently long to melt the solder, whereupon the spring closes the valve, thus preventing further mixture going forward.

The lighting-pilot burners (which are used for ignition only of the main burners) are supplied by an 'Aeromatic' natural draught injector. This injector supplies eight lighting-burner jets, each of which terminates at a point on the water-cooled burner mounting plate adjacent to one of the main burner nozzles. As air must not be drawn into the combustion chamber during normal operation, the pilot supply is valved each side of the injector. These valves are closed, extinguishing the pilot flame as soon as the main burners are all seen to be ignited. Ignition of the pilot lighting burners is carried out by gas torch through an inspection sight hole in the combustion chamber, fitted with a 'Vitreosil' cover which is closed during operation.

A magnetic valve inserted in the pilot gas supply ensures that no gas can pass to the pilot injector until the kiln vent fan is in operation.

Combustion Safety Controls

The main burners are normally ignited in sequence, and extinguished in reverse sequence. They are arranged so that they cannot be ignited, or the carburettor started up, until the pilot lighting burners are in operation. This is effected by a Honeywell-Brown 'Protectoglo' instrument, the controlling electrode of which is placed so as to be in contact with the flame of main burner No. 1 and also the adjacent pilot lighting flame. The electrically-operated valve controlled by relay through the 'Protectoglo' instrument is situated in the main gas supply to the carburettor, the motor of which is also in circuit with the instrument. The 'Protectoglo' relies for its operation upon the passage of a current of electricity through the ionised envelope surrounding a flame, the electrode of the instrument being inserted directly into both pilot lighting and main burner flames. This electric current is amplified through a thermionic valve circuit, and, through relays, operates a magnetic valve which is fitted in the gas supply. In the event of flame failure at the main burners, therefore, the 'Protectoglo' instrument operates, shutting off gas to the carburettor almost instantaneously, and switching off current to the carburettor motor. An alarm also notifies the operator of a breakdown.

Ignition and Starting-Up

(1) The main gas supply and electric current to the plant having been switched on, the kiln vent fan is started up. This energises the magnetic valve in the pilot lighting injector gas supply.

(2) The cocks in front of and behind the 'Aeromatic' injector are opened, and a light applied by gas torch to the eight pilot jets. These are inspected to see that all are ignited.

(3) The pilot flame opposite No. 1 main burner impinges on the 'Protectoglo' electrode, completing the circuit through the flame, and thus causing the magnetic valve in the main gas supply to the carburettor to be energised. This can then be lifted manually, and will remain open so long as the 'Protectoglo' electrode is energised by a flame. The carburettor motor, with which it is interconnected, can then be started up.

(4) Main burner cocks 1 to 8 are now started-up in sequence starting with No. 1. The 'Protectoglo' electrode is now energised and its circuit kept 'live' by main burner flame No. 1.

(5) Pilot lighting flames are all now extinguished by closing the valves on the inlet and outlet of the 'Aeromatic' injector. The combustion chamber sight door is closed and the plant is thus sealed from air ingress.

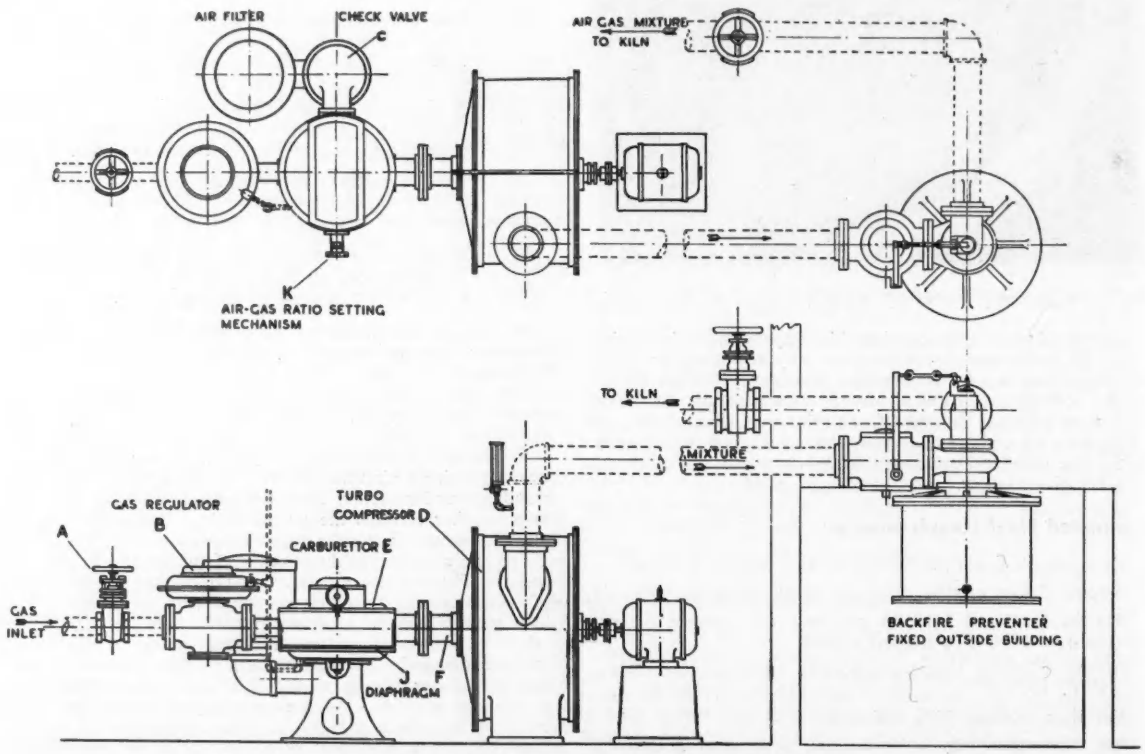

Fig. 6.—Layout of Air-Gas Carburettor and Compressor.

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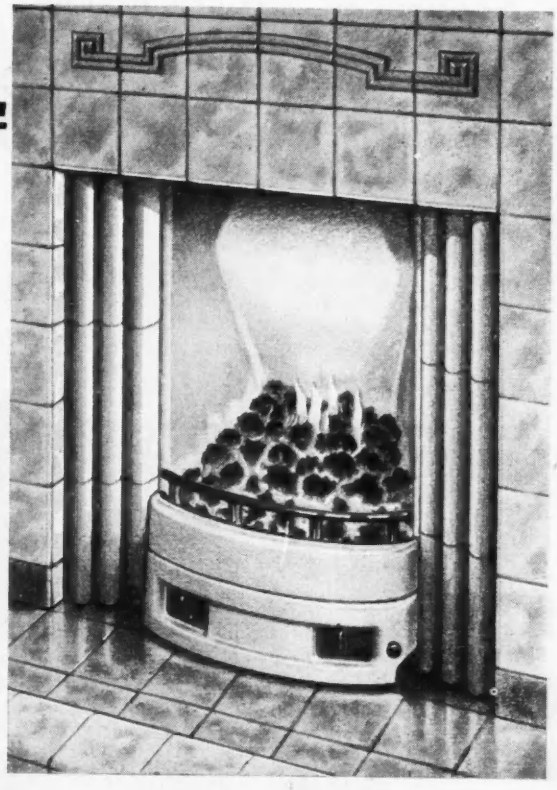

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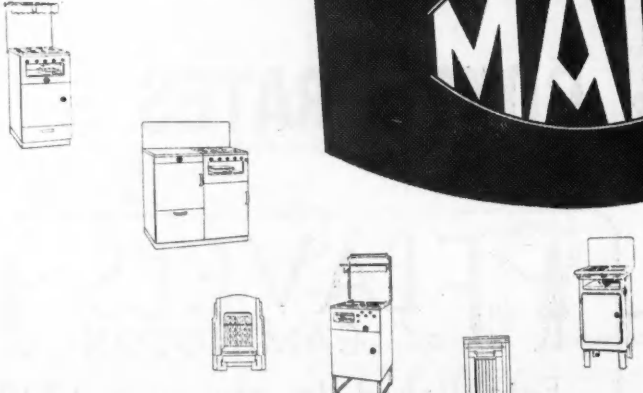

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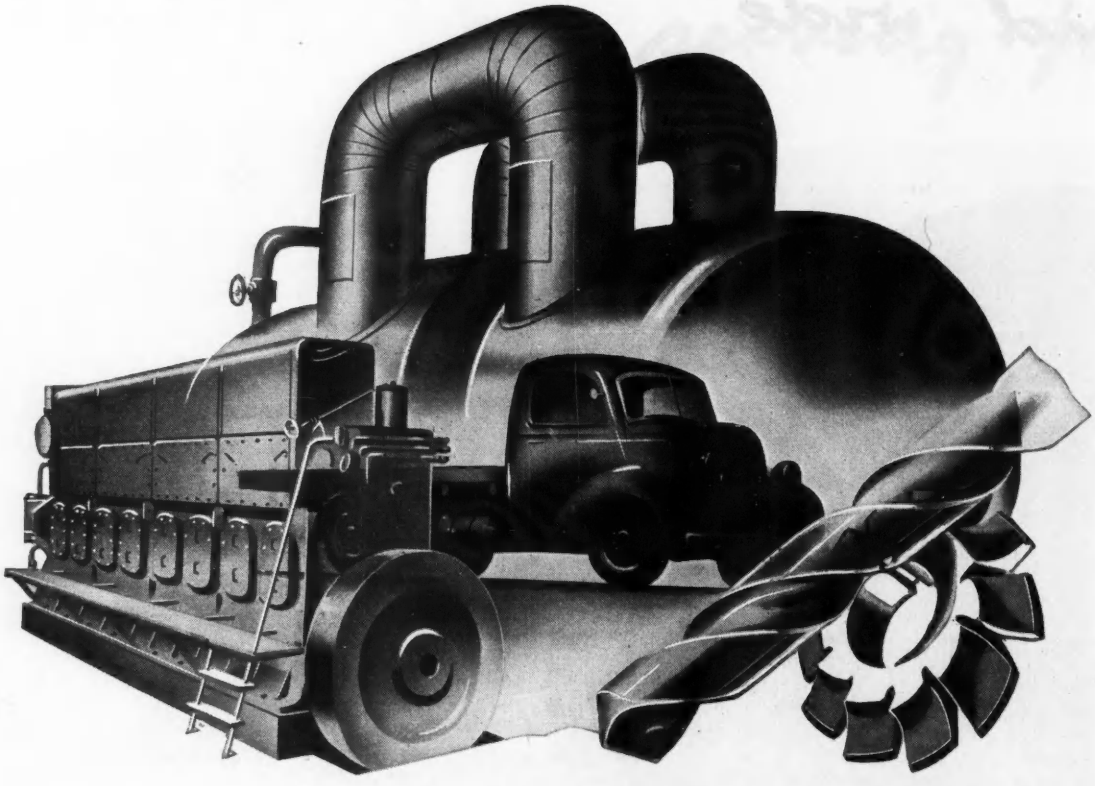

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(6) The recycle fan is now started up.

(7) Upon reaching operating temperature in the kiln, the char feed conveyors are set in motion, these being interconnected for obvious reasons.

It will be seen from the foregoing that every reasonable precaution has been taken to prevent an unignited explosive mixture from being passed into the kiln at any time, and, since all affected ancillary units are interconnected electrically, flame failure results in almost instantaneous shut-down, leaving the plant in a safe condition.

Temperature Indication

This is effected by a Cambridge 12-point indicator and two four-point recorders, the thermocouples of which are inserted in various positions in the kiln hearths, recycle duct and combustion chamber. A single point recorder is also provided to record maximum char temperature, this being inserted in the char falling from one hearth to the next at the point of highest temperature. Another critical temperature is that of the char leaving the cooler, and a thermometer is provided at this point.

A Cambridge oxygen indicator and recorder is provided, which gives continuous indication of the percentage of O_2 present in the kiln atmosphere.

The instrument can be fitted with an alarm giving notification of any rise or fall in the O_2 content of the kiln gases beyond predetermined limits.

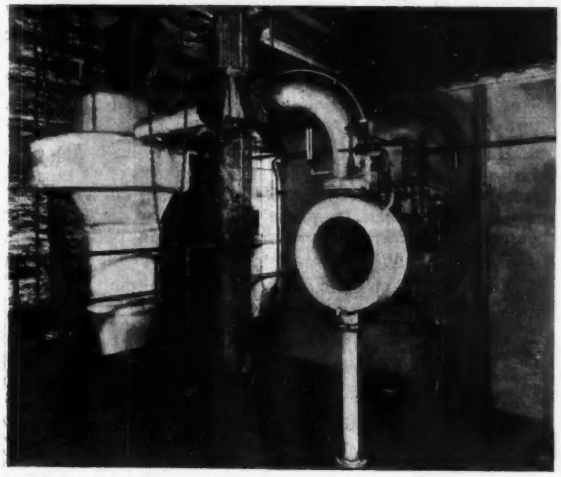

Fig. 7.—Gas-Fired Herreshoff Kiln showing Burner Manifold Cyclone Dust Extractor in recycle duct at left.

Owing to the geographical position of the refinery, town gas is received from either or both of two of the Liverpool gas undertaking's manufacturing stations, Linacre and Athol Street. It is unfortunate that while one of these stations produces straight retort gas of a specific gravity of 0.466, the other (due to the present plant and coal situation) produces a mixture of retort gas, carburetted water gas, and enriched producer gas, having a specific gravity which may on occasion rise as high as 0.645.

Changes in specific gravity of gas to the site of the plant may, therefore, take place at any time of the day or night, and it is not practicable to arrange predetermined times.

As the air/gas proportioning is performed in the carburettor by means of a slide valve having gas and air orifices, it can be seen that a change in specific gravity of gas will affect the air/gas ratio, and, therefore, the O_2 content of the kiln gases.

Calculations showed that a change of specific gravity from 0.466 to 0.645 (with accompanying change of gas constituents) might have the effect of raising the O_2 content of the kiln atmosphere during decarbonisation from 2.5% to 5.25%, with possible serious effects upon the char being treated. It was assumed that such a change would result in over-decarbonisation of the char almost immediately, and efforts were therefore made to find an O_2 indicator and controller which would operate instantaneously, and by means of which the slide of the carburettor could be adjusted to compensate for the changed conditions. It was found to be impossible to obtain an instantaneous reading O_2 instrument suitable for industrial conditions. However, experimental work on the laboratory plant established that the time factor was not so critical as had been believed, and it was accordingly agreed to rely upon manual adjustment.

A Sigma gravitometer was therefore installed having a distant reading indicator and recorder, situated together with the O_2 instrument in sight of the operator.

Changes in specific gravity and corresponding changes in the O_2 content of the kiln atmosphere are thus indicated, and manual adjustment made on the slide of the air/gas carburettor by means of the calibrated micrometer screw arrangement.

Air Cooling and Pre-drying of Char

It will be noted that a considerable amount of waste heat is available in the water from the exit char cooler. Early consideration was given to the question of using air instead of water for cooling, and of using this heated air for pre-drying and char entering the kiln, thus increasing the overall efficiency of the plant. In the early stages, however, information was not available on suitable indirect air coolers and their performance, and, since the plant was of an experimental nature, it was decided initially to use water cooling.

The drained char from the cisterns is skipped into a hopper, from which it is fed through an adjustable gate on to a rubber band which delivers it into the top hearth of the kiln. The drive to this band is fitted with Croft variable speed gear, and the char input can be controlled by controlling the band speed or adjusting the aperture in the feed gate. An alarm is fitted to give a visual and audible warning if the input of char to the kiln ceases for any reason. As the char entrance to the top hearth is not sealed, a quantity of air is drawn into the top hearth. At the temperatures prevailing this is of no consequence, and it will be referred to later as leakage air.

From the bottom hearth the char is raked on to the top tube plate of a water-cooled tubular cooler. The cooler is of M.S. welded construction, with 1-in. o.d. tubes expanded into M.S. tube plates, and the tubes are arranged vertically with the char passing through the tubes. A slotted plate is fitted to the bottom of the cooler, and under this is an oscillating slotted plate arranged to open and close twice for each revolution of the kiln shaft. The output of char is controlled by the length of time for the opening and closing of this plate.

If the output is exceeding the input at any time the bottom hearth becomes denuded of char, and vice versa. To obviate this, an inspection window was inserted into the bottom hearth, and this enables the operator to notice any such tendency and to make necessary adjustments.

Operation of the Nichols-Herreshoff Gas-Fired Kiln

When first put into operation the kiln was operated solely for reactivation of char—*i.e.*, an inert atmosphere was maintained in the kiln. No difficulty was experienced in maintaining the oxygen in the kiln gases at less than 0.5%. It is of interest to note that at this time the first practical application of a recently discovered flame phenomenon[3] was made on this kiln. This was the utilisation of the calyx flame as an instantaneous indication to the operator of perfect combustion. When coal gas is mixed with exactly the quantity of air required for perfect combustion, a flame of

this mixture, burning in its own products of combustion, is surrounded by an intense violet sheath which has been called the calyx. If there is a deficiency or an excess of air beyond narrow limits there is no calyx. Therefore, when operating under neutral atmosphere conditions in the kiln the calyx should always be visible. In general, the gas/air mixture ratio given by the Holmes-Kemp carburettor was found to be very constant, though one factor which was found to cause variation in the mixture was the partial blockage of the filter on the air inlet pipe. By systematic cleaning and replacement of the filter this cause of variation was eliminated.

The amount of water in the input char varies from time to time, but manual control of the main gas valve is sufficient to maintain a substantially constant final temperature of the char.

The object of recirculating cooler gases from near the top of the kiln into the combustion chamber is primarily to reduce the high temperature of the gases going into the kiln. It is found, however, that a much better distribution of heat in the kiln is obtained, due to the larger volume of gases in circulation. The ratio of recycled gases to combustion gases can be varied up to about 3 to 1, this ratio giving a combustion chamber temperature of about 1,500°F. when using 10,000 cu.ft. of gas per hour. The best results are obtained with a ratio of about 2 to 1, giving a combustion chamber temperature of about 1,750°F. and gas temperatures on the two bottom hearths of about 1,100°F.

Tests were carried out to find the maximum capacity of the kiln, and, as the future installation of pre-drying equipment was envisaged, these tests covered wet and pre-dried chars. During the tests suitable measurements were made to enable heat balances to be drawn up.

The results are shown in Tables I and II.

TABLE I

	Pre-dried char feed	Wet char feed
% Water in feed char	5·6	19·1
Char input (tons/hr.)	4·05	4·58
Char output (tons/hr.)	3·82	3·58
Gas used (cu. ft./hr.)	6265	9757
Water to cooler (gal./hr.)	2098	900
Temperature of stack gases (°F.)	262	315
Temperature of combustion chamber (°F.)	1450	1700
Temperature of char out (°F.)	284	216

where T = throughput in tons dry char/hour and W = % water in char (dry basis). The throughput shown in Table III can be expected.

TABLE III

% Water in char	Throughput tons dry char/hr.	Gas required (cu. ft./hr.)
5	6·5	9,700
10	6·5	12,000
15	5·2	12,000
20	4·3	12,000

It was decided to increase the gas supply to 12,000 cu.ft. per hour, and to install a tubular cooler with cooling surface double that of the original.

With this new equipment the capacities shown in Table IV were determined.

TABLE IV

	Wet char feed	Pre-dried char feed
% Water in input char	21·3	5·2
Char input (tons/hr.)	5·40	7·18
Char output (tons/hr.)	4·24	6·77
Gas used (cu. ft./hr.)	12,100	10,500
Water to cooler (gal./hr.)	1,160	2,330
Temperature of stack gases (°F.)	378	333
Temperature of comb. chamber (°F.)	1,770	1,730
Temperature of char ex cooler (°F.)	167	273

Quality of Char Reactivation

Exhaustive tests were made to determine the quality of the char burning obtained and the quality of liquors treated with this char. In addition, the effect on the chemical and physical properties of the char was also studied.

A summary of the results obtained is:—

1. Quality of the char burning is very good, and can be maintained at a very high level of uniformity.

2. When using the char, decolorisation, ash removal, and pH of liquors can be maintained at a level equal to our best retort burnt chars.

3. Herreshoff burnt char and the liquors from it are practically sterile; retort burnt chars are often much more infected, due to the inherent lack of uniformity during burning.

4. Over a special 16 weeks' test run no great change occurred in the chemical analysis of the char, but there was a slight increase in the calcium sulphate content.

5. Dust formation is no greater than with retort kilns.

TABLE II

Heat Balances

Quantities of Heat in B.Th.U./hr. above Datum of 60°F.

Pre-dried Char Feed

Input		Output	
Input char, sensible heat	73,783	Output char, sensible heat	419,186
Gas, sensible heat	7,112	Heat of wetting restored	171,384
Gas, gross C.V.	2,863,678	Water ex char cooler	1,137,484
Combustion air	23,948	Water ex burner plate	44,779
Cooling air to spindle	13,604	Stack gases, S.H.	349,172
Leakage air	8,103	Stack gases, L.H.	763,363
Balance being assumed due to exothermic actions	236,853	Radiation and convection losses	341,813
	3,227,081		3,227,081

Thermal efficiency = 78·3%

Wet Char Feed

Input		Output	
Input char, sensible heat	371,700	Output char	285,630
Gas, sensible heat	10,330	Heat of wetting restored	160,641
Gas, gross C.V.	4,436,325	Water ex cooler	1,002,025
Combustion air	36,447	Water ex burner plate	78,347
Cooling air to spindle	11,078	Stack gases, S.H.	793,093
Leakage air	17,078	Stack gases, L.H.	2,261,853
Balance being assumed due to exothermic actions	126,555	Radiation and convection losses	427,924
	5,009,513		5,009,513

Thermal efficiency = 74·7%

Thermal efficiency is here defined as

$$100 \left(\frac{\text{Heat for drying, heating, and restoring heat of wetting}}{\text{Gross C.V. of the gas used}} \right)$$

In these tests the throughput was limited by the gas supply when using a wet char feed, and when using pre-dried char, by the cooler capacity. From the heat balance data an equation was derived which would enable the throughput for various water content of chars to be calculated. The equation was: Gas required (cu.ft. per hr.) $= T\,(972+61W)+1{,}267$,

Waste Heat Recovery and Pre-drying

Calculations show that, of the total heat required for drying and buring char, about one-third is required for heating and about two-thirds for drying. Therefore, if the heat evolved by cooling the char could be recovered and utilised for pre-drying at 100% efficiency, it should be sufficient to

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To help our manufacturers and exporters and our defence services we invite your personal co-operation to ensure the speeding up of the cycle of collection and despatch of all process and other scrap from your works. In addition a considerable quantity of scrap can still be secured by dismantling obsolete plant, and we do hope you will have a special survey made of all plant in your establishment with a view to discarding now any plant no longer of use to you.

Your scrap merchant can assist in dismantling and collection, however difficult, but should you still meet special problem the Joint District Scrap Committee will advise.

These appeals sponsored by the B.I.S.F have not been lightly phrased —scrap *is* vital to the steelmaking capacity of this country.

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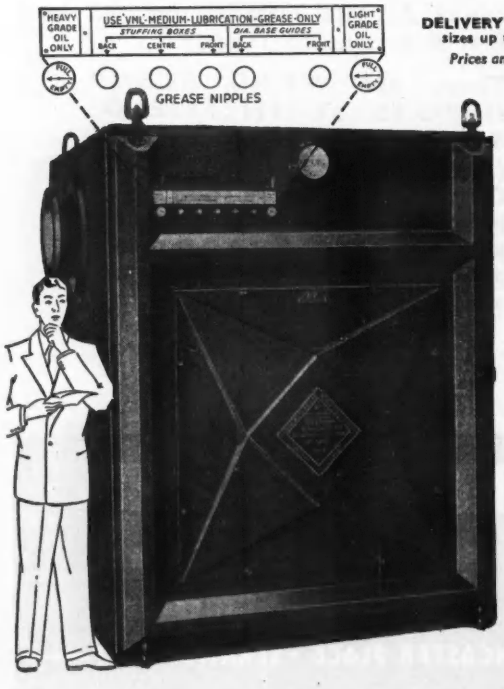

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reduce the water content of the char from 20% to 10%. In actual fact, more than the theoretical quantity of heat has to be supplied in order to balance heat losses, the principal ones being:

(1) Radiation and convection losses from external surfaces.

(2) Sensible and latent heat in stack gases.

(3) Heat lost in char cooling water.

By installing an air cooler it should be possible to recover the heat from the cooling char in the form of heated air. If this air is then mixed with the stack gases and the mixture utilised for pre-drying the incoming char, much of the sensible heat in the stack gases can also be recovered. Calculations show that the mixed gases could be safely cooled to 160°F. without condensation of water vapour occurring.

With a view to finding how much pre-drying can be expected, the figures in Table V have been calculated. It is evident that, depending on the efficiency of recovery and utilisation, the incoming char could be reduced to between 10.6% and 15.3% water.

TABLE V

%Water in char to kiln	5	10	15
Max. throughput (tons/hr.)	6·5	6·5	5·2
Gas usage (cu. ft./hr.)	9,700	12,000	12,000
Heat required to pre-dry (B.Th.U./hr.)	2,960,000	2,060,000	880,000
Recovered heat available	1,850,000	1,930,000	1,600,000
Water content ex drier 100% recovery efficiency	10·6	10·6	10·6
Water content ex drier 50% recovery efficiency	15·3	15·3	15·3

A minimum heat recovery of 50% should be attainable, and, under these conditions, the char could be pre-dried to about 15%, with an increase in thermal efficiency of the kiln (on the basis of heat required to heat in fuel used) to about 94%.

Work proceeding elsewhere on suitable types of air-cooling and pre-drying equipment is now almost complete, and in the near future this equipment will be installed.

The amount of char used—*i.e.*, reactivated—in a refinery depends somewhat on the type of process used and the products marketed. In the U.S.A. it is usual to use about 50% on input solids, but in this country we use about 20% to 30%. For a refinery dealing with 11,000 tons of raw sugar per week this means that about 2,200 tons of char per week have to be reactivated for a 20% usage. The capital expenditure on plant, etc., and the operating costs are, therefore, somewhat considerable. Lowering of these costs should be the aim, but the actual cost must always be balanced against the advantages obtained by having a properly burnt char of uniformly high quality.

Although the cost per therm for gas for the Herreshoff kiln is over twice that for the coal used in the retort-type kilns, this cost can be more than counterbalanced by the increased thermal efficiency, and decreased charges for maintenance, labour, and depreciation. By practising waste heat recovery, installations can be made which are more economical than our existing installations. If we consider, in addition, erection costs, space saved, and the advantages gained in operation of the refinery by maintaining a high quality char, well and uniformly burnt, it is evident that the gas-fired Herreshoff kiln can be fully justified as a means of improving char house efficiency.

Conclusions

The reactivation of char by direct contact with the products of combustion of town gas in a multiple hearth kiln has been shown to be more efficient than the present methods using indirectly heated retort kilns. By pre-drying the wet char with recovered waste heat, the cost can be lowered to a figure which is more economical than that given by retort kilns.

Mention has already been made of the advantage of controlling the carbon content of char. The Herreshoff gas-fired kiln is admirable for this purpose, as the atmosphere in the kiln can be controlled with great accuracy. Results obtained will not be reported in this paper, as the trials are still proceeding.

References

[1] E. W. Rice. Ind. Eng. Chem., December, 1939, 31, 1516.
[2] Oliver Lyle. Technology for Sugar Refinery Workers.
[3] F. Brinsley. Inst. of Gas Engrs. Communications, 1949, No. 353, 40.

INTERMITTENT VERTICAL CHAMBERS—
(Concluded from page 104)

fuel consumption was 6-6½ cwt. per ton of coal. The subsequent provision of front wall recuperators had reduced this to 4.2 cwt., but these recuperators were quite small compared with those in No. 2 house, and the difference between the consumption in retort houses No. 1 and No. 2 was thought to be entirely due to the effect of the additional recuperative surface.

Mr. F. B. Waller mentioned that he had in mind a plant where 85 therms had been produced, and he thought this was of interest in view of Mr. Baker's figure of 74.

Mr. Baker: We can get 85 therms on a long cycle of 18 hours, but it is not economical. One has to bear in mind annual capital charges, and the fact that one could not get more out of the chambers than one put in. It is more economic to work your plant at the shortest cycle.

Mr. A. P. Jennings asked Mr. Baker whether the I.V.C. plant was of greater flexibility than continuous vertical retorts, and whether it was possible to put the steam in the middle rather than through the bottom chamber.

Mr. Baker remarked that the I.V.C. plant did not have much greater flexibility, but it did have the great advantage of being able to carbonise any type of coal. In regard to the question on steaming, the construction of the plant was such as to make this impracticable.

Mr. G. C. Wilson (Woodall Duckham Co.) said that while he thought the figure of £7,000 per year for re-setting and replacement costs was 'about right,' in his view replacements of bottom ironwork were necessary only every 17 years, instead of 12.

Mr. C. R. Ingham said his first experience of I.V.C. plant was in 1914, but after the first war I.V. plant went right out and did not come back into favour again until 1930, when it regained popularity owing to its greater flexibility in regard to the types of coal which could be carbonised. He felt that judicious blending of coals used would result in a reduction in the amount of breeze, and he wondered whether Mr. Baker had any figures of percentage of coke which came through on re-screening.

Mr. Baker said they did try to bring in different types of coal, one after another and to mix so far as was possible under to-day's conditions. In regard to re-screening he had no information as yet.

The **Chairman** said he felt that Mr. Baker must be feeling very satisfied with the results he was obtaining from the plant, and it must, too, have been a source of satisfaction to him to note the interest aroused by his paper.

A vote of thanks to Mr. Baker on behalf of the Section was moved by **Mr. J. W. Denton** (Torquay) and seconded by **Mr. A. C. Rea** (Bath).

BRITISH STANDARDS

The report, published as a White Paper, of the committee set up by the Board of Trade to consider the organisation and constitution of the British Standards Institution, states that industry is increasingly recognising the economic importance of standardising materials and equipment. The expansion of the Institution is 'urgently necessary.' 'Our main conclusion,' says the committee, 'is that the constitution and organisation of the B.S.I. are in general well adapted for carrying out its present work and the increased work which may be expected to fall on it. We recommend that the B.S.I. should remain under the control of its own council.'

The B.S.I. has expressed general acceptance of the recommendations.

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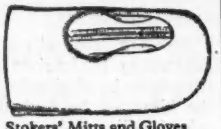

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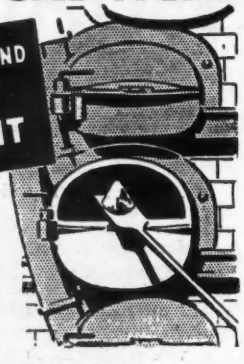

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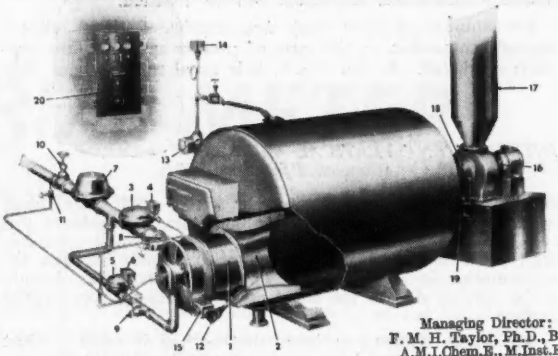

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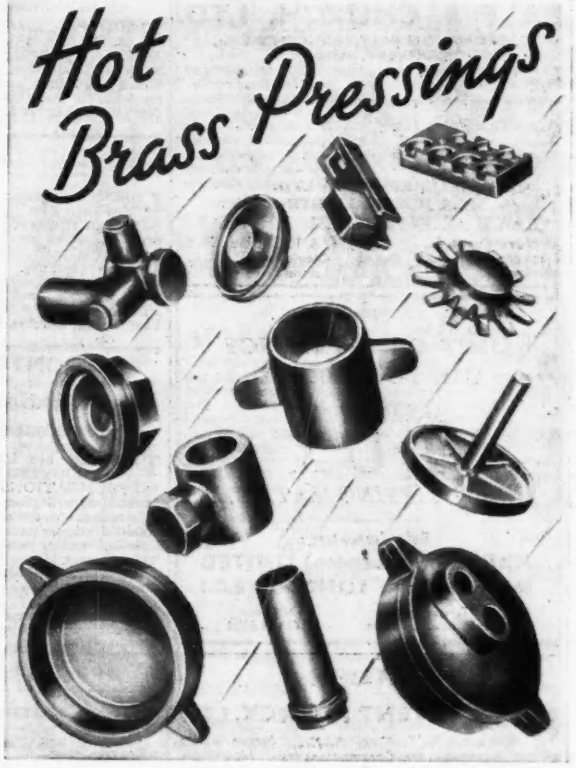

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LEICESTER GROUP.

APPLICATIONS are invited for the position of COST ACCOUNTANT at the Leicester Group. Experience in the Gas Industry is desirable.

The salary scale will be Grade XII of the National Salary Scales (£645/£770), the commencing salary being determined in accordance with the experience and qualifications of the successful candidate.

The successful candidate will be required to pass a medical examination and the appointment will be subject to the provisions of such Superannuation Scheme as may be adopted by the Board.

Applications stating age, experience, qualifications, present appointment and salary, together with the names of two referees, should be sent to the undersigned, to be received not later than April 23, 1951.

A. GWYNNE DAVIES,
Secretary.

Beverley House,
University Road,
Leicester.

EAST MIDLANDS GAS BOARD

LEICESTER AND NORTHANTS DIVISION.
NORTHAMPTON UNDERTAKING.
SALES AND SERVICE SUPERINTENDENT.

APPLICATIONS are invited from suitably qualified persons for the above position.

Applicants should have good experience in administration and be competent, under the general direction of the Sub-Divisional Sales and Service Manager, to organise and control sales of appliances and general service to consumers in the Northampton Undertaking. Experience of the use of gas for industrial purposes will be an advantage.

The commencing salary will be within Grade A.P.T. IX of the National Salary Scales for Gas Staffs (£520-£620 per annum) with placing according to experience.

The successful candidate will be required to pass a medical examination and the appointment will be subject to the provisions of any Superannuation Scheme which may be adopted by the Board.

Applications, stating age, and giving details of education, training, qualifications and experience, together with the names of two referees, should be forwarded to the undersigned not later than April 14, 1951.

C. C. WOOD,
Divisional General Manager.

Gas Offices,
Millstone Lane,
Leicester.
March 31, 1951.

EAST MIDLANDS GAS BOARD

LINCOLN UNDERTAKING.
SHIFT SUPERINTENDENTS.

APPLICATIONS are invited from suitably qualified persons for the appointment of SHIFT SUPERINTENDENTS (three in number) for the Works of the Lincoln Undertaking.

Candidates should have the Higher Grade Certificate of the Institution of Gas Engineers or an equivalent technical qualification. Experience in the control of Woodall-Duckham continuous vertical retorts will be an advantage.

The salary will be within A.P.T. Grade VII of the National Salary Scales (£450-530 per annum), with placing according to qualifications and experience.

The appointments will be subject to the provisions of any Superannuation Scheme which may be adopted by the Board, and the successful candidates will be required to pass a medical examination.

Applications, stating age and giving details of education, qualifications and experience, together with *copies* of two recent Testimonials, to be forwarded to the undersigned for receipt not later than Thursday, April 26, 1951.

B. CLARKE,
Divisional General Manager.

Belle Vue House,
Carline Road,
Lincoln.

PUBLISHERS' NOTICE

The "Gas Journal" is published every Wednesday, price 1/-; by post 1/2d.

NEW SUBSCRIPTION and CLASSIFIED ADVERTISEMENT RATES OPERATING FROM JAN. 1, 1951.

Subscription Rates: Home and Empire :- 52/- per annum; Foreign :- 60/- per annum. (Both payable in advance.) A copy of the "Gas Journal" Calendar & Directory is presented each year to continuous subscribers.

Classified Advertisements: All small classified advertisements are charged at 1/9 per line (approx. 7 words) - minimum charge 10/6. A Box Number address occupies 2 lines, and a further 6d. is charged towards cost of postage on replies. Copy must be received by first post on Monday to ensure insertion in that week's Journal.

Displayed Advertisements: Rates obtainable on application to the Business Manager. Change of copy for displayed spaces must be received 14 days prior to publication if proofs are required. Type area of inside pages 10" deep x 7" wide: block screen 120.

BUSINESS MANAGER: S. T. CULLEN

MIDLANDS OFFICE: 10, Union Street, Birmingham.

NORTHERN MANAGER: W. Q. Foster, 33, St. Helens Road, Harrogate. 'Phone: Harrogate 84291.

WALTER KING, LTD., 11, Bolt Court, Fleet Street, London, E.C.4.

Telephone: CENtral 2236-7. Telegrams: Gasking, Fleet, London.

APPOINTMENTS VACANT (ctd.)

SALESMAN for cookers and other gas appliances for London area wanted. State age, experience and salary required. No. 9958, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

DRAUGHTSMEN required, experienced in Gas Works and Bye-Product Plants. Good pay for experienced men capable of Design and Development Work. Apply, stating experience and qualifications, to W. C. Holmes & Co., Ltd., Whitestone Iron Works, Huddersfield.

NORTHERN GAS BOARD

STOCKTON DIVISION.

APPLICATIONS are invited for the following positions :—

ASSISTANT DISTRIBUTION ENGINEER—STOCKTON UNIT.

ASSISTANT DISTRIBUTION ENGINEER—HARTLEPOOL UNIT.

The salary in each case will be within Grade VI of the National Salary Scales (£415/495 per annum).

Minimum qualification the I.G.E. Ordinary Grade Certificate in Gas Engineering (Supply).

The successful applicants may be required to pass a medical examination and subscribe to such scheme of superannuation as the Board may subsequently adopt.

Applications stating qualifications and experience, together with references, should be in the hands of the undersigned not later than April 30, 1951. Applicants should also state whether their applications apply to the position in either Unit.

F. L. Scaife,
Divisional General Manager.

Northern Gas Board,
(Stockton Division),
Thompson Street,
Stockton-on-Tees.
April 3, 1951.

SOUTH EASTERN GAS BOARD

EAST SURREY DIVISION.

MECHANICAL SUPERINTENDENT,

WADDON WORKS.

APPLICATIONS are invited for the position of MECHANICAL SUPERINTENDENT at Waddon Works, Purley Way, Croydon.

Applicants should have a good theoretical and practical knowledge of the usual plant to be found at a large Gas Works and be fully competent to maintain a steam raising plant, steam and internal combustion engines, stoking machinery, turbines, boosters and pumps, etc. They should also be familiar with mechanical handling plant and hydraulic machinery and have had extensive practical and supervisory experience in mechanical workshops practice.

Corporate membership of the Institution of Mechanical Engineers would be an advantage, but this is not insisted upon if Gas Works experience has been extensive.

The minimum age limit is 35 and the salary will be not less than Grade X of the salary scales of the National Joint Council for Gas Staffs (Metropolitan Area) in respect of Male Administrative, Professional and Technical Staffs (£600-£700 per annum).

A house is available at an economic rental.

Applications in writing (quoting reference V 10/131) giving particulars of age, training, experience, present occupation, etc., should reach the Personnel Manager, South Eastern Gas Board, Katharine Street, Croydon, not later than Friday, April 20, 1951.

DRAUGHTSMAN with sound knowledge of gasworks and allied chemical plant design required. Age 35 or upwards. Pension scheme. Permanent position to suitable applicant.

Fullest details of experience, age and salary, to R. & J. Dempster, Ltd., Gas Plant Works, Manchester 10.

SOUTH WESTERN GAS BOARD

NORTH DEVON SUB-DIVISION.

APPLICATIONS are invited for the position of WORKS FOREMAN at the Ilfracombe Works of the above Sub-Division.

Applicants must have had considerable experience in the Control and operation of Machine Charged Horizontal Retorts, Electric Plant, including Detarrer and the usual Gas Works Ancillary Plant.

The salary will be within Grade VI of the National Joint Council for Intermediate Grades (Provincial B) £365 x £15-£410 according to experience. A house is available at a reasonable rental.

Applications stating age, experience, together with the names of two referees to be forwarded to the undersigned by April 21, 1951.

J. H. Lowther,
Sub-Divisional Manager.

SOUTH WESTERN GAS BOARD

CHELTENHAM SUB-DIVISION.

GLOUCESTER UNIT.

SENIOR CHEMIST.

APPLICATIONS are invited from suitably qualified and experienced persons for the above position. Candidates should possess at least a Chemical Degree or Higher Grade Certificate of the Institution of Gas Engineers in Gas Engineering (Manufacture).

Applicants must be fully qualified to undertake the Chemical Control of the Works under the direction of the Station Engineer.

The situation offers excellent opportunities. Present manufacturing plant includes Horizontal and Continuous Vertical Retorts, C.W.G. plant and Jones' Gas Plant.

The Works is developing very rapidly and extensions at present on hand include the installation of a 6 million cu. ft. per day "Manchester" Process Liquid Purification Plant.

A flat will be available at a reasonable rent.

The commencing salary for the post will not be less than £490 per annum, rising by annual increments to £570 per annum in accordance with Grade VIII of the salary scale of the National Joint Council for Gas Staffs.

CHEMIST.

APPLICATIONS are invited for the above position. A good training in plant control is essential, and experience in all routine work in connection with gas production in Horizontal and Continuous Vertical Retorts and C.W.G. Plants.

The commencing salary will be within the range of £385-£465 per annum. Grade A.P.T. V of the salary scale of the National Joint Council for Gas Staffs.

The successful applicants for the above positions may be required to pass a medical examination.

Applications giving details of age, qualifications, experience, together with *copies* of two recent Testimonials, should be received by the undersigned not later than April 30, 1951.

A. L. Morris,
Manager.

Cheltenham Sub-Division,
South Western Gas Board,
North Street,
Cheltenham.

SOUTHERN GAS BOARD

CENTRAL DIVISION.
TECHNICAL ASSISTANT,
READING WORKS.

APPLICATIONS are invited for the above position. The salary will be within Grade A.P.T. IV. Prov. "A" of the National Scales (£250-£420) according to qualifications and experience.

Applicants should possess the Ordinary Grade Certificate of the Institution of Gas Engineers as a minimum qualification, and should have had experience in the operation of Vertical Retorts, C.W.G. Plant and Modern Purification Plant.

Applications, stating age and details of qualifications and experience, should be received by the undersigned not later than April 28, 1951.

D. L. Rumble,
Engineer & Manager.

Reading and District Gas Undertaking,
King's Road,
Reading.

EASTERN GAS BOARD

NORWICH DIVISION.
WORKS SUPERINTENDENT.

APPLICATIONS are invited for the position of WORKS SUPERINTENDENT at the Lowestoft Undertaking. The Works produces 300 million cubic feet per annum. Applicants should have experience in modern methods of gas manufacture and be capable of taking charge of the Undertaking in the absence of the District Manager and possess the Higher Grade Certificate in Gas Engineering (Manufacture). The successful candidate will be required to pass a medical examination. The commencing salary will be within the range of A.P.T. VIII and a flat adjacent to the Works will be made available at a reasonable rent.

Applications giving details of age, qualifications and experience, together with the names of two referees, should be forwarded to the undersigned not later than 14 days from the date of this notice.

John H. Greenacre,
Manager, Great Yarmouth Group.

40, King Street,
Great Yarmouth,
Norfolk.
April, 1951.

NORTH EASTERN GAS BOARD

BRADFORD GROUP.
JUNIOR TECHNICAL ASSISTANT (WORKS)—SKIPTON DISTRICT.

APPLICATIONS are invited for the above position, for which the salary payable will be within Grade A.P.T. V (£370 to £450 per annum) of the Salary Scales of the National Joint Council for Gas Staffs.

Applicants should have completed their period of National Service or be beyond the age when they will be required to undertake such service, and should have a sound knowledge of normal routine testing as applied to modern gas works practice and, preferably, should hold the Ordinary Grade Certificate of the Institution of Gas Engineers (Manufacture). The position involves technical assistance on the Works in addition to laboratory duties.

The appointment will be subject to (*a*) such superannuation scheme as the Board may adopt and (*b*) the successful applicant passing a medical examination.

Applications stating age, experience, training, etc., should be addressed to the Group General Manager, North Eastern Gas Board, Britannia House, Bradford, to reach him within ten days of publication of this advertisement.

J. C. Gardner,
Secretary.

Bridge Street,
Leeds, 2.
April 2, 1951.

(*Classified advertisements continued on Supplement* 4)

APPOINTMENTS VACANT (ctd.)

JUNIOR DRAUGHTSMAN required, preferably experienced in gas and chemical engineering, A.E.S.D. rates paid.—W. C. Holmes & Co., Ltd., 119, Victoria Street, Westminster, S.W.1.

WEST MIDLANDS GAS BOARD

WALSALL DIVISION
JUNIOR DRAUGHTSMAN—
WALSALL DISTRICT.

APPLICATIONS are invited from suitably qualified persons for the position of JUNIOR DRAUGHTSMAN at the Pleck Works, Walsall District.

The salary for the post will be not less than £385 per annum on commencement, rising by annual increments to a maximum of £465 per annum in accordance with Grade V of the salary scales of the National Joint Council for Gas Staffs.

Applicants should possess a sound knowledge of structural and general engineering work.

The successful applicant may be required to pass a medical examination and to subscribe to such scheme of superannuation as the Board may adopt in future. Any existing superannuation rights in the Gas Industry would be maintained.

Applications, giving personal details, particulars of training, qualifications and experience, and the names of two referees, should be addressed to Mr. E. Hardiker, Divisional Manager, West Midlands Gas Board, Walsall and District Division, Tame Bridge, West Bromwich Road, Walsall, to reach him not later than fourteen days after the appearance of this advertisement. Applicants are requested to quote ref. T.P.3 when replying to this advertisement.

F. H. CURETON,
Secretary.

WEST MIDLANDS GAS BOARD

NORTH STAFFS DIVISION.
STOKE-ON-TRENT DISTRICT.
ASSISTANT MAINTENANCE & CONSTRUCTIONAL ENGINEER.

APPLICATIONS are invited from suitably qualified persons for the above appointment.

Applicants should have served an apprenticeship in Mechanical Engineering, and should possess drawing office experience.

The person appointed will be responsible to the Maintenance and Constructional Engineer for plant maintenance, and for the control of skilled maintenance staff of all types. Applicants should have some experience in the preparation of estimates.

The successful applicant may be required to pass a medical examination, and the appointment will be subject to such superannuation regulations as the Board may, in due course, adopt.

The salary for the post will be not less than £510 per annum on commencement, rising by annual increments to a maximum of £570 per annum, in accordance with Grade VIII of the salary scales of the National Joint Council for Gas Staffs.

Applications should be addressed to Mr. J. E. Stanier, Divisional Manager, West Midlands Gas Board, North Staffordshire Division, Etruria Gas Works, Stoke-on-Trent, to reach him within fourteen days after the appearance of this advertisement. Applicants are requested to quote ref. T.P.3 when replying to this advertisement.

F. H. CURETON,
Secretary.

WEST MIDLANDS GAS BOARD

WALSALL & DISTRICT DIVISION.
ASSISTANT WORKS MANAGER—
SOUTH STAFFORDSHIRE MOND DISTRICT.

APPLICATIONS are invited for the position of ASSISTANT WORKS MANAGER at the South Staffordshire Mond Works.

The person appointed will be in direct control of all fitting shop and maintenance personnel, and should previously have had supervisory workshops' experience. He will be directly responsible to the Works Manager for the efficiency and maintenance and repair of machinery, and must have sound practical experience in the operation and maintenance of water tube boilers, turbines, boosters, pumps and mechanical handling plant.

The salary for the post will be not less than £450 per annum on commencement, rising by annual increments to a maximum of £530 per annum in accordance with Grade VII of the salary scales of the National Joint Council for Gas Staffs.

The appointment will be subject to such Superannuation Regulations as the Board may in due course adopt, and the successful candidate may be required to pass a medical examination.

Applications, giving details of age, qualifications and experience, together with the names of two referees should be addressed to Mr. E. Hardiker, Divisional Manager, West Midlands Gas Board, Walsall Factory Estate, Tame Bridge, West Bromwich Road, Walsall, to reach him not later than fourteen days after the appearance of this advertisement. Applicants are requested to quote ref. T.P.3, when replying to this advertisement.

F. H. CURETON,
Secretary.

WEST MIDLANDS GAS BOARD

SHROPSHIRE DIVISION.

APPLICATIONS are invited for the position as ACCOUNTANCY ASSISTANT at the Divisional Headquarters of the Shropshire Division.

Applicants should have a general experience of accounting procedure, preferably with reference to the centralised control of accounts, and should be conversant with modern methods of machine accounting.

The salary for the post will be not less than £425 per annum on commencement, rising by annual increments to a maximum of £500 per annum in accordance with Grade D of the salary scales of the National Joint Council for Gas Staffs.

The appointment will be subject to such superannuation regulations as the Board may, in due course, adopt, and the successful applicant may be required to pass a medical examination.

Applications giving details of age, qualifications and experience, together with the names of two referees, should be addressed to Mr. C. M. D. Belton, Divisional Manager, West Midlands Gas Board, Shropshire Division, Sidney House, School Court, Shrewsbury, to reach him not later than fourteen days after the appearance of this advertisement. Applicants are requested to quote ref. T.P.3 when replying to this advertisement.

F. H. CURETON,
Secretary.

WEST MIDLANDS GAS BOARD

WARWICKSHIRE DIVISION.
RUGBY DISTRICT.
DISTRICT INSPECTOR—FITTINGS.

APPLICATIONS are invited from suitably qualified persons for the above position.

Candidates must have a sound knowledge of domestic and commercial gas appliances, gas fittings and consumer service generally.

The salary for the post will be not less than £385 per annum on commencement, rising by annual increments to a maximum of £465 per annum in accordance with Grade V of the Salary Scales of the National Joint Council for Gas Staffs.

The appointment will be subject to such superannuation regulations as the Board may, in due course, adopt, and the successful candidate may be required to pass a medical examination.

Applications stating age, qualifications and details of training and experience, together with the names of two referees, should be addressed to Mr. A. Allen, Divisional Manager, Warwickshire Division, West Midlands Gas Board, Gas Street, Coventry, to reach him not later than fourteen days after the publication of this advertisement. Applicants are requested to quote ref. T.P.3 when replying to this advertisement.

F. H. CURETON,
Secretary.

WEST MIDLANDS GAS BOARD

WORCESTERSHIRE DIVISION.
MALVERN DISTRICT—
DISTRIBUTION SUPERINTENDENT.

APPLICATIONS are invited from suitably qualified persons for the above position.

The successful candidate will be responsible to the District Manager for all matters of gas distribution, utilisation and consumer service in the Malvern and associated districts.

The salary for the post will be not less than £490 per annum on commencement, rising by annual increments to a maximum of £570 per annum, in accordance with Grade VIII of the salary scales of the National Joint Council for Gas Staffs.

The appointment will be subject to such superannuation regulations as the Board may, in due course, adopt, and the successful candidate may be required to undergo a medical examination.

Applications stating age and details of qualifications and experience together with the names of two referees, should be addressed to Mr. C. F. W. Rendle, Divisional Manager, West Midlands Gas Board, Worcestershire Division, 12, St. Nicholas Street, Worcester, to reach him not later than fourteen days after the appearance of this advertisement. Applicants are requested to quote ref. T.P.3 when replying to this advertisement.

F. H. CURETON,
Secretary.

WALES GAS BOARD

PORT TALBOT UNDERTAKING.
SHIFT FOREMAN.

APPLICATIONS are invited from suitably qualified persons for the position of SHIFT FOREMAN at Aberavon Gasworks.

The successful applicant will be required to supervise Works employees and to take general charge of the practical side of gas production on a regular rota system of six 8-hour shifts per week.

Applicants should have extensive experience in the maintenance and practical operation of large scale purifiers, normal Gasworks ancillaries, mechanical plant, and preferably in the practical operation of C.W.G. plant.

The Salary will be Grade IX of the Intermediate Grades Agreement (£440-£485 per annum). Conditions 1 of the Agreement to apply.

The successful applicant will be required to pass a medical examination.

Applications, stating age, qualifications and experience, together with details of present and previous appointments, and giving the names of two referees, should be forwarded to the undersigned within 14 days of the publication of this advertisement.

W. F. EDWARDS,
General Manager & Secretary.

Port Talbot Gas Undertaking,
18, Station Road,
Port Talbot, Glam.

WALES GAS BOARD

PORT TALBOT UNDERTAKING.
RELIEF SHIFT FOREMAN.

APPLICATIONS are invited from suitably qualified persons for the position of RELIEF SHIFT FOREMAN.

The successful applicant will be required to supervise Works employees and to take general charge of the practical side of gas production for approximately three shifts per week on regular rota, and such other shift work as may be determined by the incidence of holidays or other irregular causes. The remaining duties will be carried out during normal working hours and will be connected with general works' maintenance.

Applicants should have extensive experience in the maintenance and practical operation of large scale purifiers, mechanical plant, normal gasworks ancillaries, and preferably in the practical operation of C.W.G. plant.

The Salary will be Grade IX of the Intermediate Grades Agreement (£440-£485 per annum) when acting as Shift Foreman, and at appropriate N.J.I.C. rates for other work.

The successful applicant will be required to pass a medical examination.

Applications, stating age, qualifications and experience, together with details of present and previous appointments, and giving the names of two referees, should be forwarded to the undersigned within 14 days of the publication of this advertisement.

W. F. EDWARDS,
General Manager & Secretary.

Port Talbot Gas Undertaking,
18, Station Road,
Port Talbot, Glam.

NORTH WESTERN GAS BOARD

WIRRAL GROUP.
DEPUTY STATION ENGINEER—
WALLASEY.

APPLICATIONS are invited for the position of DEPUTY STATION ENGINEER—WALLASEY.

The successful applicant will be responsible to the Station Engineer for the general supervision of all the activities carried out on the Works, including the control of labour. Applicants should possess the Higher Grade Certificate (Gas Engineering-Manufacture) of the Institution of Gas Engineers or its equivalent.

The commencing salary will be within Grade A.P.T. IX of the National Salary Scales (£520-£620 per annum) according to experience and qualifications.

The successful applicant may be required to pass a medical examination, and to subscribe to such scheme of Superannuation as the Board may adopt.

Applications, suitably endorsed, giving personal details, particulars of training, qualifications and experience, together with the names and addresses of two referees, should reach the General Manager of the North Western Gas Board (Wirral Group), Gas Offices, Hind Street, Birkenhead, not later than 12 days after the publication of this advertisement.

NORTH WESTERN GAS BOARD

BLACKBURN GROUP.
SENIOR SHOWROOM ATTENDANT—
ACCRINGTON DISTRICT.

APPLICATIONS are invited from suitably qualified persons for the appointment of SENIOR SHOWROOM ATTENDANT, which will cover the main and subsidiary showrooms in the Accrington District.

Applicants must have had experience of Showroom supervision and sales, and preference will be given to holders of the Institution of Gas Engineers' Certificate in gas salesmanship and consumer service.

The appointment will be subject generally to the conditions of service as agreed by the National Joint Council for Gas Staffs from time to time, and the commencing salary, which will be according to ability and experience, is within Grade A.P.T. VI of the National Salary Scales (£415-£495 p.a.).

The successful applicant may be required to pass a medical examination, and to subscribe to such scheme of superannuation as the Board may adopt.

Applications, giving age, details of qualifications and experience, together with the names and addresses of two persons to whom reference may be made, should be forwarded to the General Manager of the North Western Gas Board (Blackburn Group), Cardwell Place, Blackburn, within 14 days of the publication of this advertisement.

NORTH WESTERN GAS BOARD

WIRRAL GROUP.
CHEMISTS.

APPLICATIONS are invited for the following positions:—

(1) CHEMIST—BIRKENHEAD GAS WORKS.
(2) CHEMIST—CHESTER GAS WORKS.

The successful applicants will be responsible to the Station Engineer of the Gas Works for conducting all necessary chemical tests associated with the process work being carried on, and to the Chief Chemist for any special investigations proposed from time to time.

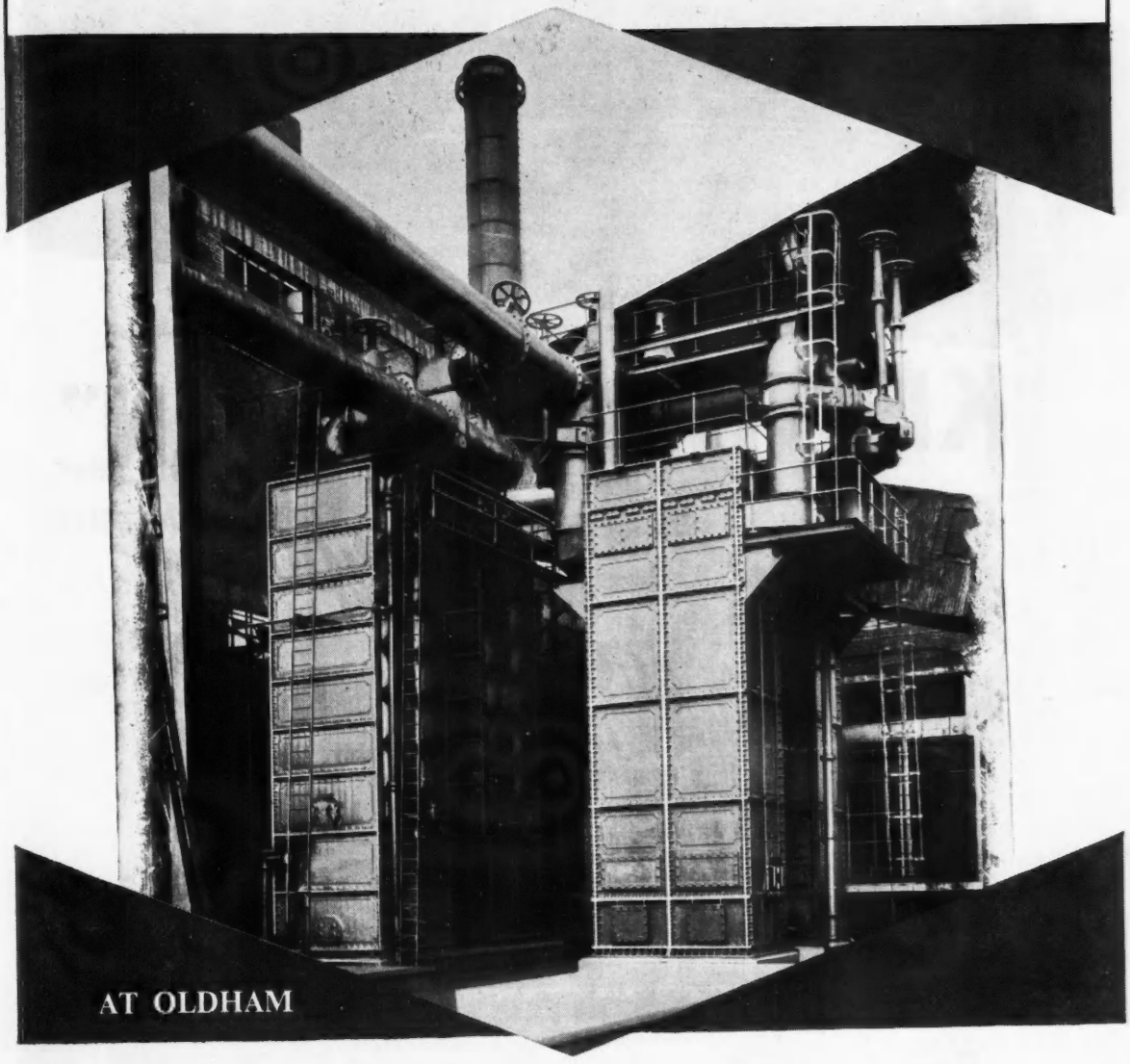
Previous experience on a Gas Works is not necessary, but applicants should possess a degree, preferably in Chemistry, or its equivalent.

The commencing salary will be within Grade A.P.T. VIII of the National Salary Scales (£490-£570 per annum), according to experience and qualifications.

The successful applicant may be required to pass a medical examination, and to subscribe to such scheme of Superannuation as the Board may adopt.

Applications suitably endorsed and giving personal details, particulars of training, qualifications and experience, together with the names and addresses of two referees, should reach the General Manager of the North Western Gas Board (Wirral Group), Gas Offices, Hind Street, Birkenhead, not later than 12 days after the publication of this advertisement.

MODERN CONDENSING PRACTICE



AT OLDHAM

Two types of Holmes high efficiency Condensers installed at the Oldham Gasworks.

Left. Super Type Horizontal Tube Condensers mounted upon tar and liquor separators.

Right. Multipass Vertical Tube Condensers, incorporating Holmes patent sprays for maintaining clean internal conditions.

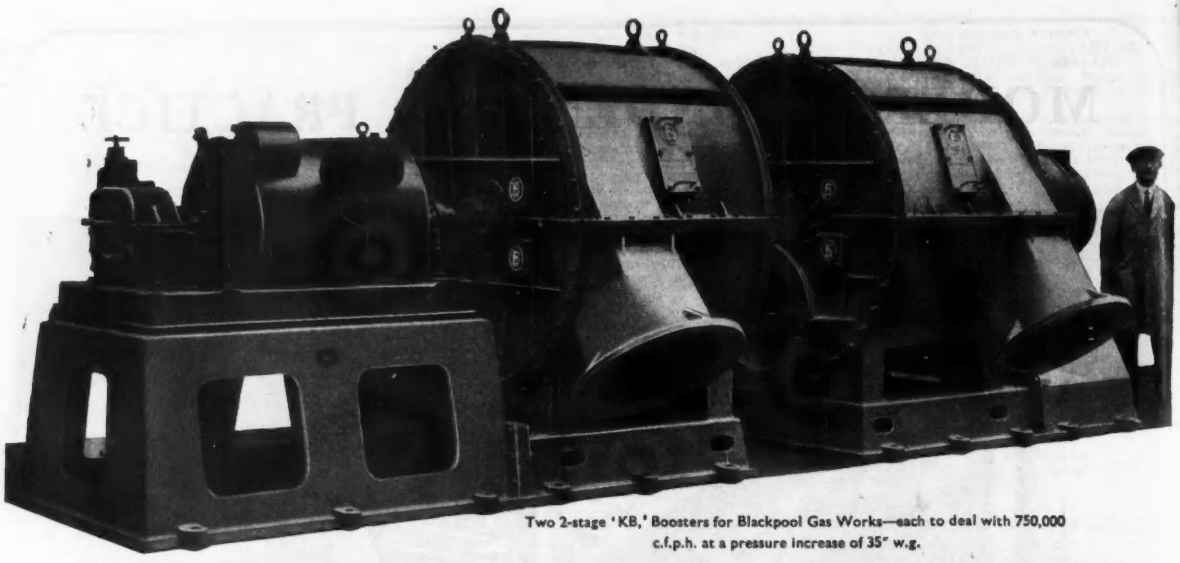
Reproduction by courtesy of the North Western Gas Board.

FOUNDED 1850 HOLMES HUDDERSFIELD

W. C. HOLMES & CO. LTD · TURNBRIDGE · HUDDERSFIELD

Telephones: HUDDERSFIELD 5280 LONDON: Victoria 9971 BIRMINGHAM: Midland 6830

C364



Two 2-stage 'KB,' Boosters for Blackpool Gas Works—each to deal with 750,000 c.f.p.h. at a pressure increase of 35" w.g.

"KEITH-BLACKMAN"

FANS *for every purpose*

for which fans can be employed profitably in or by the Gas Industry

VENTILATION

GAS BOOSTING and EXHAUSTING

FORGE and FURNACE BLAST

MAN-COOLING

WE make all types of Fans—"High Efficiency" for boosting or exhausting gas up to 3 lbs. p.s.i. and for volumes from 5,000 to 1,500,000 cfph; Cast Iron and Steel-plate "Pressure" fans for up to 2 lbs. p.s.i. air blast to furnaces, forges, water gas plants, burner equipment, etc; "Turbo" fans for applications requiring up to 6 lbs. p.s.i.; "Centrifugal" fans for draught on boiler fires to ensure economical steam production, or for cold air douche to workers in retort houses, etc.; "Centrifugal" or "Axial" fans for supplying ventilating air through ductwork; "Propeller" fans for moving air in volume for ventilating; "Propeller" fans on portable structures for cooling workers at furnace fronts; and "Tenaxe" fans for re-circulating high temperature gases and air in various types of heat treatment furnaces.

WHEN you need fans for moving air or gases give us an opportunity of making practical suggestions.

HEATING

MECHANICAL DRAUGHT

FURNACE RE-CIRCULATING

COLD AIR DOUCHE

DRYING

KEITH-BLACKMAN LTD

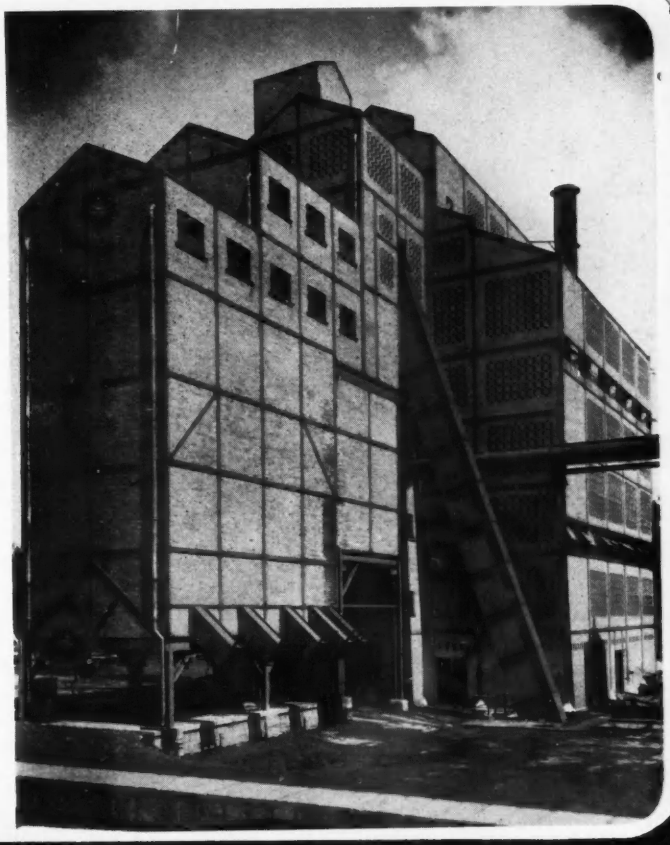
MILL MEAD ROAD, TOTTENHAM, LONDON, N.17.
TN: TOTenham 4522. TA: "Keithblac Norphone London."

MANCHESTER, 4: 26 Corporation Street. Tel. No.: Blackfriars 4228. BIRMINGHAM, 2: 75 New Street. Tel. No.: Midland 0317-8.
LEEDS, 1: 40/41 Royal Exchange Chambers. TN. Leeds 27286. NEWCASTLE-ON-TYNE 1: 21 Mosley St. TN: Newcastle 22284.
SCOTLAND: 90 Mitchell Street, Glasgow, C1. TN: Central 7973. IRELAND: 7 Brunswick St. Belfast. TN: Belfast 21114.
SOUTH WALES: 127 Stanwell Road, Penarth, nr. Cardiff. TN: Penarth 249.

FAN MANUFACTURERS' ASSOCIATION LIMITED

Printed by STRAKER BROTHERS] LTD., E.C.2, for WALTER KING, LIMITED, 11, BOLT COURT, FLEET STREET, LONDON, E.C.4. Wednesday, April 11, 1951.

Work in progress



BOX HILL, VICTORIA
AUSTRALIA

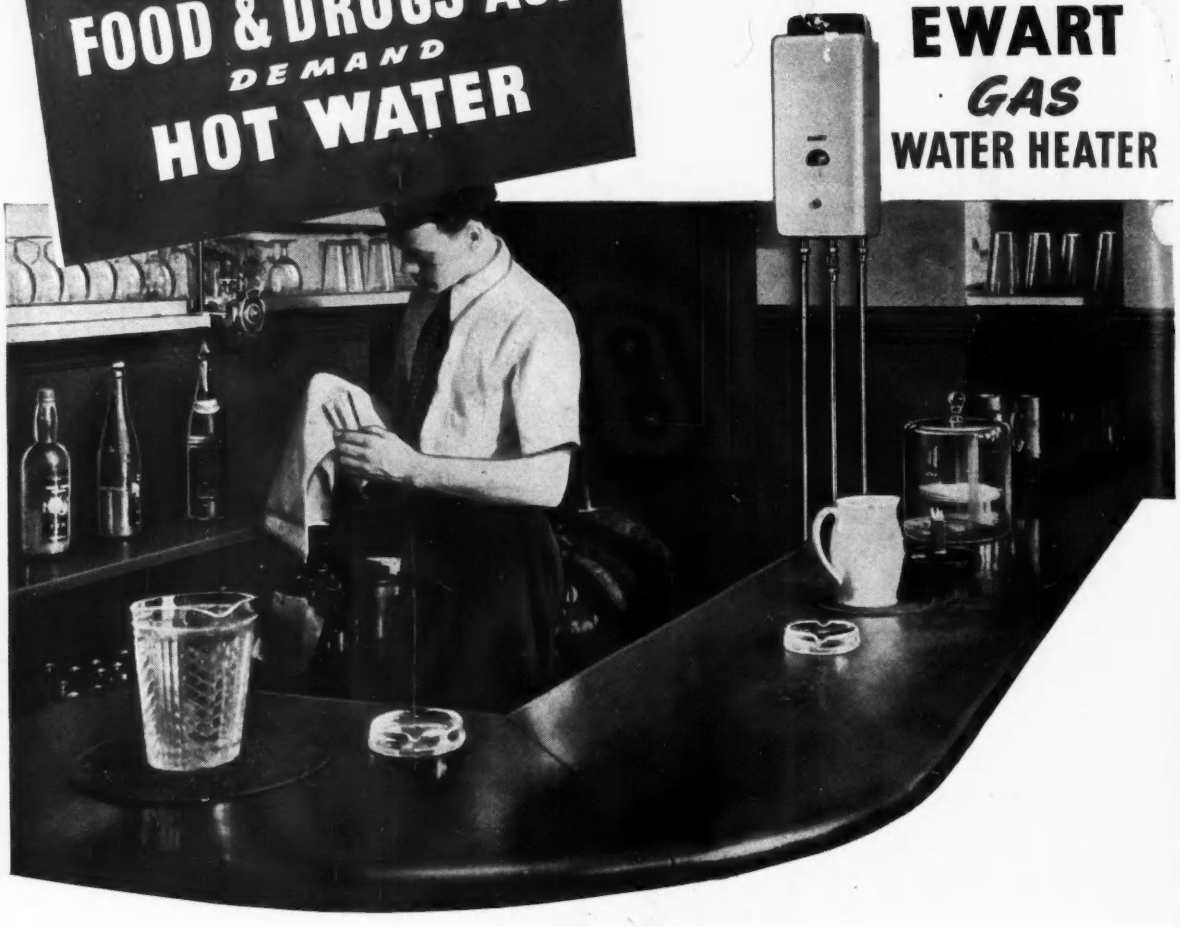
A view of the Coke Plant end of the new Glover-West Retort House.

West's Gas
IMPROVEMENT CO., LTD.
MILES PLATTING, MANCHESTER, 10
Telephone: COLlyhurst 2961–5. Telegrams: Stoker, Manchester.
London Office: COLUMBIA HOUSE, ALDWYCH, W.C.2. Telephone: HOLborn 4108–9. Telegrams: Westgasco, Estrand.

PUBLIC HYGIENE *and the* FOOD & DRUGS ACT *DEMAND* HOT WATER

For plenty of cheap **HOT WATER** *on tap*

-FIT A **EWART** *GAS* **WATER HEATER**



Ewart Multipoints are made in a number of types and sizes giving an instant and constant supply of hot water from 1¼ to 16 gallons per minute. Wherever hot water is required in the home, factory or business premises, and to conform with the requirements of the Food and Drugs Act, in shops, hotels and restaurants, a EWART gas water heater is available which exactly meets the need. A EWART geyser is designed to give maximum hot water supply at minimum cost of fuel and maintenance. The water *never* runs cold.

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